THE IRON TRADE REVIEW

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CLEVELAND, O., MAY 28, 1891.

THE WEEK IN IRON CIRCLES.

General Features. The growing doubts about the outcome of the crops have been largely set at rest by the rains throughout the country during the past week. In some localities, perhaps, they did not come soon enough, but generally the harm done by the drought is not severe. Iron consumption continues in advance of production, and stocks are down almost to the minimum recorded point. The continued drain on our gold reserve, with the consequent tightening up of money markets, has increased the feeling of extreme caution that has characterized all dealings since the troubles of last Fall. Any decided improvement, therefore, is likely to be postponed until the financial situation is cleared up somewhat. There has not been much change in the furnace situation North and South. Among the few active furnaces in Northern Ohio, complaint comes of local labor troubles that has caused stoppage. In the Birmingham district nearly all the furnaces are producing, and there is proof of improved practice both in the larger proportion of higher grades, and in the increased output. The coke strike has been officially declared at an end. The total production of the Connellsville region last week was 50,825 tons, an increase of 5,730 tons over the previous week. A still greater increase is looked for this week. The pig iron situation in the Central West may be outlined as follows: Business at Detroit during the past week has certainly been anything but dull, but we still have to report, also, anything but entirely satisfactory as far as figures are concerned. There was, to be sure, some strength shown in prices on Southern foundry and forge irons, but no decided advance. One round lot of Southern forge went at $10 cash, at the furnace, while another brought a slightly higher figure, owing to the extensions in delivery. No transactions whatever can be noted on Northern coke irons, except a few cars of blackband ore iron and Jackson county silveries. Lake Superior charcoal showed continued large transactions, chiefly in the Eastern and Central markets. Prices were low, but no lower than they have been. The market generally may be said to look a trifle better. The general situation, at Chicago, is somewhat improved; the outlook seems to point toward better prices and more activity among melters of iron. Lake Superior charcoals, which for weeks have been selling at the lowest prices ever known, have advanced, and the leading companies are now all holding at $18.00, Chicago. Local coke irons are scarce for immediate and early delivery. Southern coke irons are moving in round lots. Buying at Louisville continues fair, with some parties now showing a disposition to buy for long deliveries, and there has been two or three instances where buyers have been in the market for running twelve months, and in some cases for deliveries to begin next Fall and running throughout the coming season. One of the largest companies has sold 10,000 to 14,000 tons on basis of $10.25 for grey forge, Birmingham, and is standing firmly at this price, which may be considered the price asked to-day for grey forge by the leading companies with very little disposition on the part of others to shade. Considering the present amount of production, the demand at Buffalo may be called first-rate. Many large consumers, in fact, are very close to the danger line, the foundries drawing their supply from day-to-day shipment. The unlimited confidence every one has had that when pig iron was wanted, it would be forthcoming, has resulted in absolutely annihilating stocks on hand at many large foundries. That prices do not advance is undoubtedly due to the large idle furnace element which may at any time resume operations. The market at St. Louis seems to be in a better condition at present than it has been since the low-priced iron has been ruling, which extends over a period of several months.

The Local Situation. After many months of waiting and hoping, after consultations innumerable and agreements as plentiful, after debating with the vesselmen, with the furnacemen, with the railway officials and with the coke makers, the bottom has dropped out of the ore market as completely as it did out of the pig iron market some months since, and a flood of sales is reported this week at prices which well bear out the statement of one man who, denying that ore was being sold, stoutly maintained that it was being given away. The disaster is not confined to any particular brand of ore, nor to any one mining locality, except that quite the largest portion of the ore sold was of the lower grades, and which is another argument in favor of the foundry trade to come. There has been sold up to date about 600,000 tons of Norrie ore, about two-thirds of which is for local consumption, the rest going into Chicago, and the price is $4.50. The six mines comprising the Colby syndicate, with the Colby, Tilden, Aurora, Palms, Comet, and Superior mines, producing a total, in 1890, of about 900,000 tons, will not mine more than 275,000 tons this year. The Colby is already shut down, having stock piles of 90,000 tons, of which 50,000 is sold. The price, which last year averaged $5.25, is believed to be only a trifle better than $4, this year. The other five mines in the syndicate have discharged two-thirds of their hands, and are running the other third only to fill their contracts. Chapin, which has been held for $4.50, has been finally sold at $4 25. Large sales have been made of old mine hematite, at $4.25, and of Lake Superior No. 1, but the price of the latter is not quoted. A big block of No. 1 grade Champion has been sold at $5.50, the lower grade, Suffolk by name, having already found a market. These latter sales have all been made on the basis of a decreased output, the reduction in the amount to be mined averaging from seventy-five per cent. in some cases, to twenty-five in others. Hamilton ore has been sold at $4.25, and others are going in the same proportion. It must not be forgotten that a great deal of the ore here reported as sold has been on the docks all along the lower lakes ever since the close of navigation, last Fall, and that, therefore, the totals of these sales, amounting, perhaps, to a million tons in all, ought not to be taken into consideration as to the matter of production this year.

LATER.—Wednesday's developments in Pittsburgh and Youngstown go to show that the coke syndicate is on top once more, that the railways will maintain their rates, and that the agreement of the valley furnaces is at an end. A meeting of pig iron producers was held in Pittsburgh, on Wednesday, to meet Mr. Frick and the railway representatives. The latter were conspicuous by their absence, and Mr. Frick, who had led the furnacemen to believe they could contract for $1.75 coke, expressed regret at his inability to do so, announcing the price at $1.90. He was asked why he had held out inducements to the furnacemen to sell coke at $1.75, and in reply stated that such was his original intention, but that on consultation with his mining superintendents he found that he could not make a $1.75 rate, without cutting down the price of labor, which would be an impolitic step at this time. In response to the furnacemen's statement that they could not make pig iron with $1.90 coke, and live, Mr. Frick said that Mr. Carnegie was in want of 30,000 tons of Bessemer for which he offered $16. The furnacemen declined the offer, and returned to Youngstown, where a meeting of the valley association was held with the result of rescinding the agreement under which the furnaces banked their fires last December. It is understood that Pickands, Mather & Co.'s furnaces will go into blast at once, and that others are soon to follow.

FUTURE MARKETS FOR POCAHONTAS COKE.

It will not be long before Ohio and Northwestern consumers will be getting their coke supplies from Virginia, if present signs go for anything. A significant fact in this connection is the announcement that the Cumberland Valley Railroad is reported as now carrying from 30 to 40 cars of coke daily, which it delivers to the Pennsylvania Road at Harrisburg. This coke is hauled a long distance to Harrisburg (about 435 miles), coming from the Pocahontas region, on the Norfolk & Western Railroad.

The Norfolk & Western Railroad, which is the energetic seeker after new markets in this case, seems to be steadily pushing for the Northwest. There is now no longer any doubt that Mr. B. C. Faurot, President of the Columbus, Lima & Milwaukee Railroad, has disposed of a large block of his holdings to the Norfolk & Western people, who have a line nearly completed to Ironton, O., where they connect with the Scioto Valley road into Columbus. It is said that Dudley Farlin, an old and experienced railroad man, of Albany, and at present holding the position of President of the Manhattan Oil Company, will take the active management of the building of the line. It is also said that Governor D. B. Hill, of New York, Postmaster General Wanamaker, and a syndicate of Philadelphia bankers will furnish the money for the building of the line. When completed it will make a route from the Ohio river to Muskegon and Lake Michigan, thence by steamer to Lake Superior points.

That the Norfolk & Western "means business" is beyond question. No road in the United States made such a magnificent showing of progress, development, and profit as did this road in 1890. Even that conservative English financial authority, the London *Bullionist*, is moved to say of it:

The Norfolk & Western report for 1890 has been welcomed with effusion by most papers, and, truth to state, it is an eminently satisfactory document in every way. It tells a tale of consolidation, development and progress that is probably without a parallel even in that country of fairy tales, America. An increase in ten years of 100 per cent. in mileage, 200 per cent. in gross earnings, 900 per cent. in tonnage handled, and almost 700 per cent. in the number of passengers carried, is sufficient justification for the policy to which these results are due. But more important than anything else is the character of the country which is being so successfully developed by the road. The Pocahontas coal field in the New River valley has now definitely taken its place as one the most important in the United States. Last year there were raised for consumption and shipment almost 2,500,000 tons of coal and coke, quite 90 per cent. of this passing over the Norfolk & Western Road. Ten years ago there was no coal traffic on the Norfolk & Western, and the seams on Flat Top mountain were considered to be unworkable on account of their position. But the Norfolk & Western has surmounted these difficulties, and is now reaping the benefit of the courageous policy of its directorate.

We believe the next twelve months will witness some decided changes in the conditions now surrounding Northern and Western iron manufacturers, in respect to their supply of coke, and the Pocahontas coke will be an increasingly important factor as the months go by.

HEAVY PURCHASES OF CHARCOAL IRON.

As noted in our market summary, last week, the large agricultural implement and malleable iron manufacturers have lately gone into the market for their usual supplies of charcoal pig iron and several heavy orders have been placed. The amount purchased by the syndicate, which controls the malleable iron works in Cleveland, Chicago, Toledo, Indianapolis, and other points, is said to have reached a grand total of 40,000 tons. The large harvester works have also bought in amounts ranging from 5,000 to 15,000 tons, so that altogether, some markets have been pretty well cleaned up of this brand. Our advices, last week, were to the effect that prices had been shaded to a considerable extent. Just what concessions were made we cannot state positively, but it is said that prices paid ranged from $16 50 to $17.50, the prevailing prices being $17.50 to $18. A noteworthy fact is that these purchases were made fully a month in advance of the usual time. Some prophets there are who see in this fact an indication that prices have reached bottom and that a more lively market is to be expected in the near future. How well founded this belief is no one who desires to retain a reputation for prognosticating will say, but it seems to be very well settled that stocks in the hands of foundry men and rolling mill men are very light, indicating an early re-appearance of such consumers in the market.

THE USE OF OLD RAILS IN VALLEY MILLS.

Attention is called by Mr. H. O. Bonnell, President of the Mahoning Valley Iron Company, of Youngstown, to an injustice that is frequently done valley mills by Pittsburgh and Eastern papers, in giving out the impression that they are making prices abnormally low on account of their more extensive use of old rails, the Pittsburgh mills, in particular, being held up as "models," because they no longer use old iron rails in their manufactured iron. For instance, the Pittsburgh *Commercial Gazette* of recent date, said: "Large quantities were formerly consumed here, but within the past year or two their use in Pittsburgh has been almost abandoned. Sales are still being made here, but chiefly to buyers in the valley districts."

Concerning this statement, Mr. Bonnell writes the *Iron Age* as follows:

Now, the valley mills have been in the habit of using old iron rails precisely as our competitors in Pittsburgh have been doing for years past. The reason the Pittsburgh mills have not been using old iron rails to any great extent within the last year or two arises from the fact that the price of old iron rails ran up so high that there was no money in using them. This fact applied to the valleys as well as to Pittsburgh; and the consequence is that the use of old iron rails has fallen off here to as great an extent as it has done in Pittsburgh. Speaking of our own concern, we have not bought any old iron rails since last Summer; and, while we do not know, we are of strong opinion that other mills in this vicinity have bought comparatively very few iron rails within the last year. It seems to us that all these charges and insinuations have been published with the one object in view; and that is, to create the impression to the trade generally that bar iron and other material manufactured in the Mahoning and Shenango Valleys is inferior in quality to that made in Pittsburgh. That this is untrue can be demonstrated so easily that it is rather surprising that such persistent efforts should be made to build up the reputation of the Pittsburgh make of iron as against that of the valleys.

The valley manufacturers have good reason for feeling some sensitiveness in this matter, and Mr. Bonnell's statement should be taken as conclusive in the premises.

A "GIGANTIC GAMBLE" IN IRON WARRANTS.

If it be true that persistent clamor has killed the so-called Pig Iron Warrants Bill, for some time past pending in the British Parliament, more's the pity for legitimate trade. The *Iron and Steel Trades Journal*, of London, in its summary of the British iron markets, notes the fact that the improvement in pig iron warrants is entirely owing to speculative business, and that operators in London have succeeded in "cornering" the Glasgow market. One member of the Glasgow pig iron "ring" has gone to the wall, and this gives color to the reports current.

The London *Economist* characterizes the proceeding in the Scotch pig iron market as a "gigantic gamble," and says:

"The fight has altogether disorganized legitimate business. Buyers, well aware that the market is in the hands of a body of rampant speculators, are properly keeping aloof, and as long as the game goes on upon present lines are likely to continue doing so. No one can say, however, that the uncertainties which these periodical gambles introduce into the market can benefit trade; instead, they have a most unsettling and injurious effect on the legitimate consumer of iron. Hundreds of thousands of tons of Scotch iron have changed hands on the Glasgow market since the 1st of the month, and the apparent value has risen from about 45s. to 49s., and has fallen again to near 47s. Yet it is questionable if one single ton has been advised for legitimate consumption. At this moment the market is entirely in the hands of professional speculators, who have no lot or part with trade proper."

This is the kind of feast to which American iron makers are invited by the schemers who are attempting, under various specious pleas, to establish the warrant system in the United States. It deserves only to fail.

RECENTLY we mentioned, as a "significant triumph for American industries," the fact that the Government of New South Wales has ordered twenty-seven of our locomotives for use on a new railroad in that colony. The triumph appears even more complete in view of the statement of the *Australasian and South American*, printed elsewhere, that the introduction of American type of locomotives has been in the face of the most stubborn resistance on the part of English managers, mechanics and engineers, who have control of the Australian railway system. However, even the prejudice of years had to yield to acknowledged facts, and the palm was finally awarded to American locomotives on the ground of their great superiority in climbing heavy grades and turning sharp curves. The order figures up over $250,000.

HERE is a pregnant sentence from the current issue of the *Iron and Steel Trades Journal*, of London: "The report of Mr. Swank, General Manager of the American Iron and Steel Association for 1890, demonstrates that we have now lost our position as the greatest iron producing country in the world."

A VERY inviting programme is laid out for the Summer meeting of the Ohio Institute of Mining Engineers, to convene at Columbus, June 2. The excursions include visits to the Hocking Valley mines and extend to Charleston, W. Va., on the way to which town several mines in the Kanawha Valley will be visited. Thence the guests will be taken over the Chesapeake & Ohio Railroad to Quinnimont, in the New River coke region, returning on June 6,

HOW THE BESSEMER PROCESS WAS DISCOVERED.

Reference has heretofore been made by *The Iron Trade Review* to the letter from Sir Henry Bessemer, read at the international meeting of the British Iron and Steel Institute and the American Institute of Mining Engineers, held at Pittsburgh, in October, 1890, by Sir James Kitson, President of the British Institute. The paper is in Sir Henry Bessemer's own handwriting, and is published *verbatim* by the *Bulletin* of the American Iron and Steel Association, as follows:

DENMARK HILL, September 10, 1890.

DEAR SIR JAMES KITSON:—It is with great pleasure that I accede to your request to furnish you with a brief outline of the circumstances which led to the invention of my steel process; the more so on account of the generous interest you have always taken in the invention, notwithstanding that it aims at the overthrow of the older methods of producing malleable iron, in the production of which you have obtained so distinguished a position.

At the time of the Crimean war I had invented a mode of firing elongated projectiles from a smooth-bore gun, the rotation necessary to insure their proper position during flight being obtained by utilizing a portion of the powder-gas to produce rotation by reaction, after the manner of producing rotation in turbines, and not by rifling the gun, consequently rendering all smooth-bore guns at once suitable for firing elongated shot or shell.

I, of course, offered this plan to our own government, but it was discarded without a trial.

A little after this period I happened to be on a visit for a week or two with Lord James Hay at the house of his daughter in Paris. During this visit our host gave a farewell dinner to General Hamlin and several other distinguished officers in the French army who were going out to the Crimea. Among the guests present on this occasion was Prince Napoleon, and, while taking a cigar in the library after dinner, the conversation turned naturally enough on artillery, and I then mentioned my system of firing elongated projectiles from smooth-bore guns. The Prince was so impressed with the importance of this idea that he said he was sure that his cousin, the Emperor, would be much pleased if I would explain my invention to him, and that he would get an appointment made with the Emperor for that purpose. This was done, and I had a long and most interesting discussion with His Majesty, whom I found most thoroughly conversant with the whole subject of artillery. His Majesty, in the kindest possible way, gave me *carte blanche* to make any experiments I desired at Vincennes.

A great many 30-pounder elongated projectiles were made, and were fired from a 4½-inch, 12-pounder, smooth-bore, cast iron gun at the Polygon at Vincennes. They were fired through a succession of thin wooden targets, placed 100 metres apart, through all of which they cut irregular holes, thus showing that they went end on. A thin coat of black japan had been previously put on them, and when the shots were recovered from the bank into which they were lodged, the coat of japan was seen to be partially scraped off in spiral lines, caused by their passage through the wooden target. The angle of these scratches being carefully taken showed that from 1½ to 2¼ rotations had taken place in the length of the gun.

After many hours' practice on a cold December day we retired to the officers' quarters in the old fortress of Vicennes, and while standing round a blazing wood fire, sipping some hot spiced wine, Commandant Minie (the inventor of the rifle) observed that, although the rotation of the shot was effected, unless we had something better to make our guns of such heavy elongated projectiles could not be used with safety.

This casual observation was the spark that has kindled one of the greatest industrial revolutions that the present century has to record; for during my solitary ride in a cab that night from Vincennes to Paris, I made up my mind to try what I could do to improve the quality of iron used in the manufacture of guns.

My knowledge of iron metallurgy was at this time very limited, but that was in one sense a great advantage to me, for I had very little to unlearn, and so could let my imagination have full scope.

After many months of trial and much building up and pulling down of reverberatory furnaces I cast a small model gun. The iron was very white, and in turning it little short, curly shavings were cut off. It was wonderfully tough for cast iron, but wonderfully brittle if it was to be classed as malleable iron.

The little model gun looked very beautiful when highly polished, and I took it over to Paris and begged the Emperor to accept it as the first fruits of my studies of the metallurgy of iron. He expressed himself much pleased with it, and complimented me on having achieved a step in the right direction, and with his own hands placed it in a bureau, saying, "Some day it may become an interesting relic."

About this period I began to fully appreciate the fact that if I could improve cast iron and render it malleable, and still retain its fluid state, that apart from its use for artillery it would be of greatest commercial value for all engineering purposes. I, therefore, pursued my experiments with greater ardor than ever, for I was convinced that I was on the eve of producing a quality of metal that would supersede wrought iron.

At this time I devoted myself exclusively to these investigations, which were very costly, and I became most anxious to obtain the opinion of some able engineer as to the value of my invention, lest I might be deceiving myself and living in a fool's paradise. I consequently consulted Mr. George Rennie, the eminent civil engineer. I showed him a small upright, fixed, cylindrical converter, and in it we made a charge of 7 cwt. of Blaenavon pig iron into an ingot of malleable iron.

Mr. Rennie was in raptures with the result, and said, "You must not keep this light under a bushel for a single day longer, and, by-the bye, there is a first-rate opportunity for you. The British Association meets at Cheltenham next Tuesday. Read a paper there by all means. I am President of the mechanical section. It is true all the papers are arranged, but if you will write a paper I will take the responsibity of putting it first on the list."

He kept his promise, and I read my paper "On the manufacture of malleable iron without fuel," and which appeared *verbatim* in next day's *Times*. The entire iron trade of the kingdon was startled by the facts detailed in this paper, backed as they were by two small bars of malleable iron, one of which had been piled and re-rolled.* A few days later the ironmasters came trooping up to London to see the new process. There are many interesting incidents connected with these visits which I cannot trespass on your time to relate; but some idea of the exitement may be gathered from the fact that, notwithstanding the imperfect state of the process at that time, I was actually paid £27,000 for licences granted within one month of the reading of my paper at Cheltenham.

At many iron works the managers set to work to test the invention in the rudest possible manner with such means as they had at their disposal, all of which attempts were failures. In my experience I had used Blaenavon pig iron, which was successful, and at that time I had no idea that other brands of iron would fail in the manner they did.

No sooner were these failures known than an extraordinary revulsion of feeling was manifested; the most perfect distrust of the invention became universal; the public press, which had spoken of it in such glowing terms, now condemned it as impracticable, and spoke of it as "a brilliant meteor that had flitted across the metallurgical horizon, dazzling a few enthusiasts, and then vanishing forever in total darkness."

Prior to this invention pure malleable iron in a fluid state was wholly unknown; indeed, whole days of exposure to the most powerful furnaces then in use entirely failed to bring this material into a state of fusion, notwithstanding which I proposed to convert ordinary melted cast iron into this malleable fluid state, in quantities of five tons, at a single operation, in the short space of 15 minutes, by the mere chemical action of cold atmospheric air, and in entire absence of any fuel whatever, except that which existed in the form of carbon and silicon in the crude iron itself. It is not surprising therefore, that the ironmasters, as well as the whole press, joined in one general chorus of condemnation of what they then believed to be a perfect chimera which none but a wild enthusiast could have ever believed to be possible. I knew far otherwise, but it was no time to argue the question. Words would have been of no avail. So I set earnestly to work to try and master the difficulty that had so unexpectedly arisen. This was no easy task.

All the old investigations had to be gone over again. Experiments on a much larger scale, with larger and more powerful machinery, were found necessary, but the difficulties to be surmounted had reference more to chemical than mechanical questions. A laboratory was therefore fitted up, and I engaged the services of a professor of chemistry, at a high salary, to make an analysis of all the iron and other materials employed in our experiments, as well as a systematic analysis and classification of all the results obtained.

The very large scale on which these operations were carried out involved a considerable outlay in various ways, but there was no slackening of exertion, no cessation of the severe mental and bodily labor. In this way another long and weary year had passed and but little real progress had been made towards the removal of the difficulty; many new paths had been struck out, but they had led to no practical results. Several weeks were sometimes necessary to make and fit up the apparatus required to test each new theory as it was formulated, and it too often happened that the first hour's trial of the new scheme dashed all the high expectation that had been formed, and we had again to retrace our steps. Thus week after week went on amid a constant succession of newly-formed hopes and crushing defeats, varied with occasional evidences of improvement.

I, however, worked on steadily. Six more months of anxious toil had glided away, and things were much in the same state, except that many thousands of pounds had been uselessly expended, and I was much worn by hard work and mental anxiety. The large fortune that was almost within my grasp seemed now far off. My name as an engineer and inventor had suffered much by the defeat of my plans. Those who had most feared the change with which my invention had threatened their long-vested interests felt perfectly reassured, and could now safely sneer at my unavailing efforts, and, what was far worse, my best friends tried, first by gentle hints and then by stronger arguments, to make me desist from a pursuit that all the world had proclaimed to be utterly impossible. It was, indeed, a hard struggle, and I had well nigh learned to distrust myself, and was fain at times to surrender my own convictions to the mere opinions of others. Those most near and dear to me grieved over my obstinate persistence. But what else could I do? I had the most irrefragable evidence of the absolute truth and soundness of the principle on which my invention was based, and with this knowledge I could not persuade myself to fling away the promise of wealth and fame, and lose entirely the results of years of labor and mental anxiety, and at the same time confess myself beaten and defeated.

Happily for me the end was nigh, and in a few more months I had fully succeeded in producing steel worth from £50 to £60 per ton from charcoal pig iron which had cost me only £7 per ton, the conversion of the crude iron into steel being effected by simply forcing minute streams of cold atmospheric air upward through it for a space of 15 minutes!

Thus was the so-called fallacious dream of the enthusiast realized to its fullest extent, and it was now my turn to triumph over those who had so confidently predicted my failure. I could now see in my mind's eye at a glance the great iron industry of the world crumbling away under the irresistible force of the facts so recently elicited. In that one result the sentence had gone forth, and not all the talent accumulated during the last 150 years, of all the thousands whose ingenuity and skill had helped to build up the mighty fabric of the British iron trade—no, nor the millions that had been invested in

*One of these bars is in the possession of the Iron and Steel Institute, among my old samples.

carrying out the existing system of manufacture, with all its accompanying powerful resistance—could reverse that one great fact or stop the current that was destined to sweep away the old system of manufacturing wrought iron and establishing homogeneous steel as the material to be in future employed in the construction of our ships and our guns, our viaducts and bridges, our railroads and our locomotive engines, and the thousand and one things for which iron had hitherto been used; and yet with all this newly-developed power I was paralyzed for the moment in face of the stolid incredulity of all practical iron and steel manufacturers, which stood like the solid wall of a fortress, barring my way to the victory I had already won.

I announced the fact of my complete success to the world, and held in my hands the most undeniable proofs of the truth of my assertion, but no one would now believe it possible. They remembered but too well the great expectations that were excited two years previously by the first announcement of my invention at Cheltenham, and were not again to be disturbed by the cry of "wolf!"

Thus it happened that, after the hard battle I had fought for so many years, I found myself as far as ever from the fruits of my labor, for not a single ironmaster or steel manufacturer in Great Britain could be induced to adopt the process. Anxious to possess still further practical proofs of the value of my invention, I made a few hundredweight of steel bars at my experimental works in St. Pancras of all sizes and special qualities required in an engineer's workshop. These I took to the works of my friends, the Messrs. Galloway, engineers, of Manchester, and, unknown to any of their workpeople, these bars were given out and employed for all the purposes for which steel had hitherto been used in their extensive business. So identical in all essential qualities was this steel with that usually employed by their workmen that during two months' trial of it not the slightest idea or suspicion that they were using steel made by a new process was ever entertained by them; in fact, they were accustomed to use steel of the best quality, costing £60 per ton, and they had no doubt whatever but that they were still doing so.

I may here remark that this tool steel was made from Swedish charcoal pig iron, costing, delivered in Sheffield, £7 per ton, and it was with this high class raw material that our firm continued for about two years to manufacture tool steel for engineers, for which we obtained £44 per ton, and with which such firms as Sir William Fairbairn, Sir Joseph Whitworth, Messrs. Sharp, Stewart, etc., were regularly supplied up to the time when larger and more profitable work had made it not worth our while to continue the manufacture of tool steel.

Indeed, so satisfied were Messrs. William and John Galloway with the crucial test of our tool steel at their works that they entered into partnership as steel manufacturers with myself, my partner, Mr. Robert Longsdon, and my brother-in-law, Mr. Allen. We built a steel works in the town of Sheffield, determined to beard the lion in his den and to undersell the trade until we forced them in self-defense to take a license under my patents and carry on my process.

We soon got to work and dropped £10 per ton on railway tires, etc. This soon brought the trade to a proper frame of mind. Sir John Brown & Co. applied for a license. This was soon followed by Messrs. Charles Cammell & Co., and licenses were also granted to several ironmasters. Of course we thus created a strong rivalry with our own firm and forced our own prices down. This we were fully prepared for, as it left still a very large margin of profit.

Some idea may be formed of its importance as a manufacture, and how much the people of Sheffield have lost by their prejudice and incredulity, when I state the simple fact that, on expiration of the 14 years' term of partnership of our Sheffield firm, the works, which had been greatly increased from time to time entirely out of revenue, were sold by private contract for exactly 24 times the amount of the whole subscribed capital of the firm, notwithstanding that we had divided in profits during the partnership a sum equal to 57 times the gross capital, so that by the mere commercial working of the process, apart from the patent, each of the five partners retired after 14 years from the Sheffield works with 81 times the amount of his subscribed capital, or an average of nearly cent. per cent. every two months, a result probably unprecedented in the annals of commerce. Yours faithfully,

HENRY BESSEMER.

American Locomotives in Australia.

It is regarded as "a significant triumph for American industries," by *The Iron Trade Review*, that the Government of New South Wales has recently ordered 27 of our locomotives, for use on a new railroad in that colony. Our contemporary would be still further elated, says the *Australasian and South American*, was it conversant with the conditions under which the "triumph" was won. American locomotives have had no easy road to travel in Australia, thanks to English opposition in the "office," at the "shops," and even in the "cab." The order in question goes to a Philadelphia firm, and is based on the conceded advantage of American-built locomotives for climbing heavy grades and turning sharp curves. The freight locomotives are of the heaviest and strongest build, and with tender attached, will each weigh from 80 to 85 tons. The cost of the American-made locomotive is from $8,000 to $12,000. Those destined for Australia will be sold to the Government there for about $10,000 apiece, the sale aggregating over a quarter of a million dollars. It is a "rush" order, and a special steamer will be ready to take the engines out when complete.—[Toronto Monetary Times.

AMONG car companies orders for pig iron are gradually coming in, so that a number have what work they desire, but this is not the case with a few who are still seeking orders, but have hopes that they will shortly make contracts that will not necessitate their shutting down. One of the larger companies had just ordered a reduction in their freight car department, but within a day or two after the order was given contracts were taken that will permit of their running full.

THE BEST VESSELS ARE OWNED ON THE LAKES.

All reports of late from the government officials whose offices are connected with the marine interests, says the *Marine Review*, tend to show the immense gain in tonnage on the lakes, and the increase in high-class vessels engaged in this trade as against the poorer class of vessels on the coast and on other inland waterways. There has just been issued from the office of the supervising inspector general of steam vessels, a report of the last annual meeting of the board of supervising inspectors, which is accompanied by a great deal of statistical matter regarding the inspection of steam vessels throughout the country during the calender year 1890. From the last annual report of the commissioner of navigation, it was shown that the lakes had more steam vessels of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other parts of the country. The figures for the lakes were 272 vessels of 439,786.85 gross tons, against 207 vessels of 308,694 74 gross tons in all other parts of the country. This last report from the office of the steamboat inspection service presents a more interesting study. The total number of steam vessels inspected in the entire country during 1890 was 7,200, and their net tonnage, 1,485,022.08 tons. There is owned on the lakes 36 per cent. of this tonnage, or 1,841 steamers of 537,732.18 net tons.

Only one local district in the country, New York, has more steam tonnage than Cleveland, while the ownership of both steam and sail tonnage in Cleveland is greater than that of New York. Buffalo ranks next to Cleveland, or third among the cities of the entire country. The number of steam vessels owned in Buffalo is greater than in Cleveland, but the tonnage of the Cleveland boats exceeds that of Buffalo.

The tables below presents an interesting comparison. They show that the net tonnage of 1,841 steam vessels owned in the ten local districts of the lakes is 537,732 18, or an average of 292.08, while the net tonnage of 3.388 vessels owned in ten leading local districts on the coast and rivers is 713,532 23, or an average of only 210 60. Following is the comparison:

TEN LOCAL LAKE DISTRICTS.

Local District.	Number of Steam Vessels.	Net Tonnage.
Cleveland, O.	304	157,393.17
Buffalo, N. Y.	339	130,266.91
Chicago, Ill	199	58,148.56
Milwaukee, Wis.	210	56,534.97
Detroit, Mich.	161	55,405.25
Port Huron, Mich.	195	45,545.66
Grand Haven, Mich.	192	17,125.62
Oswego, N. Y.	114	10,784.42
Marquette, Mich.	75	3,381.68
Burlington, Vt	52	3,145 94
Totals	1,841	537,732.18

Average net tonnage of lake steam vessels, 292.02

TEN LEADING LOCAL COAST AND RIVER DISTRICTS.

Local District.	Number of Steam Vessels.	Net Tonnage.
New York, N. Y.	1,117	238,502.46
San Francisco, Cal.	265	97,705.82
New Orleans, La.	262	85,649.03
Philadelphia, Pa.	356	65,772.27
Baltimore, Md.	288	57,456.97
Boston, Mass.	445	48,028.58
St. Louis, Mo.	161	40,542.24
New London, Conn.	215	30,006.87
Savannah, Ga.	147	24,534 49
Pittsburgh, Pa.	132	24,333.50
Totals	3,388	713,532.23

Average net tonnage of coast and river steam vessels, 210.60.

Officers receiving licenses during the year were: Masters, 8,795; mates, 2,039; pilots, 7,961; engineers, 15,129; total, 33 924.

The Micro-Structure of Steel.

At a recent meeting of the British Iron and Steel Institute, M. F. Osmond, of Paris, contributed a note on the above subject, and presented to the institute a series of micro-photographs, which were exhibited last year at the Mining Exhibition, held at the Crystal Palace. Very mild steel is formed of polyhedral grains of almost pure iron, in each of which the iron presents a crystalline orientation, which is constant for the same grain, but which varies in the different grains. The grains of iron appear to be surrounded by foreign matter, carbide of iron. As the temperature is raised, the grains at first increase in size without changing their form, then they become elongated and form a group of parallel bands.

In steel of medium hardness the white portions consist of almost pure iron, and the dark portions consist of a mixture of iron and carbide, the "pearly constituent" of Dr. Sorby. In metal properly heated and well worked, the pure iron forms torn-up and discontinuous stripes; but when the temperature is raised, the formation of polyhedral grains becomes more and more evident, until the pure iron completely envelops these grains, and grows into them under the shape of fine parallel bands.

In hard steel the pure iron behaves in a somewhat similar manner, but it is, of course, of much less frequent occurrence. He succeeded in obtaining for this metal a photograph, which shows when magnified, 300 diameters, the alternately dark and brilliant striæ, discovered by Dr. Sorby, and considered by him to be alternate lamellæ of iron and carbide of iron. Independently of any theoretical interpretation, one fact in clearly indicated by the photographs. This is that each preparation defines not only the hardness of the metal, other things being equal, but also the temperature at which the metal was allowed to slowly cool. Moreover, as the structure and the mechanical properties are intimately associated, it can be easily imagined, without it being necessary to enter into fuller details, to what extent microscopic investigations may furnish useful information.

THE Chattanooga basic steel has succeeded so well in the effort to make a high grade of soft steel, that its product is practically sold for months to come at full prices. The proposed new steel plant at Birmingham, backed by the Tenn. C. I. & R. R. Co, is thought to be assured by the subscription already made, one of $100,000 cash from the Elyton Land Co.

LAKE SUPERIOR MINING NOTES.

GOGEBIC RANGE.

Work at the United exploration is progressing finely, and with encouraging results. The shaft is now down considerably over 200 feet. It is intended for working purposes, and is 7x10 feet inside, divided into compartments and carefully and heavily timbered. It is located so as to strike the deposit of ore penetrated by the diamond drill, but may have to go down something like another hundred feet in order to do so. A pump house has just been completed in a crosscut run in for the purpose at a depth of 200 feet from the surface.—[Bessemer Pick and Axe.

The stockholders of the North Pabst, situated near Hurley, are jubilant at the flattering prospects before them. The shaft has been sunk to a depth of 472 feet and is now in mixed ore. The superintendent reports that 20 feet more will bring them into good shipping ore, and at the rate they are descending now it will require about two weeks to reach the quality of ore desired. A great deal of the stock is owned in Green Bay, and letters of inquiry for stock are received from Cleveland and Chicago by every mail. Those who have held their stock through all the dark days that have passed since the mine was opened seem in a fair way to realize something handsome from their investment.—[Florence Mining News.

MENOMINEE RANGE.

The Dunn mine, at Crystal Falls, is said to bring Capt. Luke Welch the snug sum of $60,000 per year.—[Peninsular Record.

The Florence Iron River Co. has made a big sale of Eagle ore, and the shipping season was inaugurated at the Florence to-day, the first train load of ore pulling out of the mine this afternoon. This will be followed by others as fast as the necessary cars can be procured, and it is believed there will be no interruption in shipping operations from now until the close of the season. If such proves to be the case, the Florence can easily send out 150,000 tons, which will be an exceedingly good output, taking all things into consideration. News of the sale of Florence, or first-class ore, is expected at any moment, and as soon as one is made, it is highly probable that the working force at the mine will be materially increased. There are over 80,000 tons of ore in stock, and the daily output will be considerably increased. The fact that shipments have commenced in dead earnest by the local mine is especially gratifying to the people of Florence, and greater confidence in future business prospects is manifested on every hand.—[Florence Mining News, May 23.

President H. G. Fisk and Attorney E. C. Eastman, of the Buckeye Mining Co., were in the city, Tuesday, and while here transferred 20,000 shares of non-assessable stock to Chas. A. Hallet, W. W. Noyes and Chas. H. Noyes, holders of the option. The visitors made a tour of inspection over the property, and Mr. Eastman was very enthusiastic over the prospects of the speedy development of a big mine.—[Florence Mining News, May 23.

MARQUETTE RANGE.

The syndicate mines of east Negaunee range are shipping the ore that is raised from day to day. Little, if any, is going forward from stockpiles. There are something over 180,000 tons in stock at this point. The mines are looking well, and are handled so that a product for the future is always assured. Ground is kept open up well ahead, the management being alive to the best interests of those concerned in the enterprise.—[Ishpeming Iron Ore.

Mr. John McDonald, of Iron River, started upon a trip westward from Nestoria, his intention being to look for iron ore formations. He claims the fire that has just swept much of that region exposes the rocks, this making the task of exploring easier to follow than heretofore. Samples of good ore have been received from this range. He looked it over ten years ago, found afloat ore, but none in place. He thinks the district a promising one for the existence of both hard and soft ores, specimens of both having been secured there.—[Ishpeming Iron Ore.

The reduction of mine royalty by about 50 per cent. is one of the changes that must result if the owners of mineral lands expect mine operators to compete with the cheap labor and natural advantage of other fields. As now given they are too high, and in justice to the many concerned they should be lowered. Where there is a sliding scale rate the condition is not so bad, as where the royalty is fixed. When rates of royalty were made many years ago, ore was selling at double the price now secured, and royalties were figured accordingly. To equalize this decrease the price for the privilege of mining should be reduced in similar ratio. It is no more than fair, and land owners should assist the enterprise in the manner suggested.—[Ishpeming Iron Ore.

A sale of 100,000 tons of the product of the Buffalo for immediate delivery has been effected. General Manager Cole reports that inquiry for ore at present is almost entirely confined to the non-Bessemer grade. At the Sunday Lake—Wakefield—his folks have an ore that carries about 62 in iron and with but little more than a trace of phosphorus, which they have been unable to sell, while sales of some portions of the product from all the non-Bessemer mines have been made.—[Menominee Iron Herald.

A company made up of Negaunee men is developing a mine on the 40 east of the South Buffalo. A shaft has been sunk down 77 feet. The outlook at present is very promising, there being every indication that the Buffalo vein will be struck. A hoisting engine has just been put in position near the shaft, and work will be pushed hard for the next few months.—[Florence Mining News.

There is 30,000 tons of ore in stock at the Volunteer and 70,000 tons at Cleveland. The new compressor has been received and will be in operation about the first of the coming month. The property is looking well, the amount of ore in sight steadily increasing.—[Florence Mining News.

Preparations are being made to sink another (the seventh) level at the Saginaw. Owing to the scarcity of coal the past Winter they were prevented from sinking, their work being confined to the fifth level, where they were following a deposit of ore in the hanging, and from which about 4,000 tons have been obtained. They will sink to the seventh in the hope of finding something of value, and all trust they will prove successful.—[Florence Mining News.

AMERICAN TINPLATE MANUFACTURERS.

It was the privilege of the writer to attend the meeting of the tinplate manufacturers in Pittsburgh, on Wednesday, May 20, and a very business-like gathering it was. For the following points of the meeting we are indebted to the *Metal Worker:*

The firms and companies represented by delegates and by proxies at the meeting included the following: The Britton Rolling Mill Co., Cleveland; Anderson Tinplate Co., Anderson, Ind; Bellaire Nail Co., Bellaire, O.; Somer Bros. & Co., Brooklyn; Lewis Steel Sheet & Tinplate Co., Joliet, Ill.; Falcon Iron & Nail Co., Niles, O.; McCullough Iron Co., Philadelphia; Arethusa Iron Works, New Castle, Pa; Fleming & Hamilton, Pittsburgh; United States Iron & Tinplate Co., Demmler, Pa.; Marshall Bros. & Co., Philadelphia.; Scottdale Iron & Steel Co., Scottdale, Pa; Shoenberger & Co., Pittsburgh; Reeves Iron Co., Canal Dover, O.; Joseph Carns & Son, Massillon, O; Welsh-American Tinplate Co., Philadelphia; Piqua Rolling Mill Co., Piqua, O.; W. Dewees Wood & Co., Pittsburgh; P. H. Laufman & Co., Apollo, Pa.; Standard Iron Co., Bridgeport, O.; Jennings Bros. & Co., Pittsburgh; Canonsburg Iron & Steel Co., Canonsburg, Pa; St. Louis Stamping Co., St Louis; Norton Bros., Chicago; Kirkpatrick & Co., Pittsburgh; Pittsburgh Electroplating Co., Apollo, Pa.

The Committee on Organization, consisting of Messrs. Alfred Marshall, of Philadelphia; F. G. Neidringhaus, of St. Louis; D M. Somers, of Brooklyn, and W. C. Cronenmeyer, of Pittsburgh, presented a report embodying a constitution for the organization. This report was adopted substantially as presented, the most radical change being in the official name of the organization, which by vote, after considerable discussion, was adopted in the following form: "Tinned-Plate Manufacturers' Association of the United States." The constitution provides a board of managers, to consist of the four general officers and three persons to be elected from the membership, making seven in all, to which is to be referred all general questions of policy and business. This board further is authorized to employ all necessary clerical help to carry out the plans of the organization, to accumulate statistics of the industry and in all ways to conserve the interests of the members. Meetings are to be held from time to time as circumstances may seem to make expedient, but the regular annual meeting is to occur the first Wednesday in June in each year, after the present year. Annual dues are fixed at $50 per member. The membership is rigidly restricted to those actively engaged in the industry, making tinned sheets or sheets ready for tinning, or bars ready to roll into sheets.

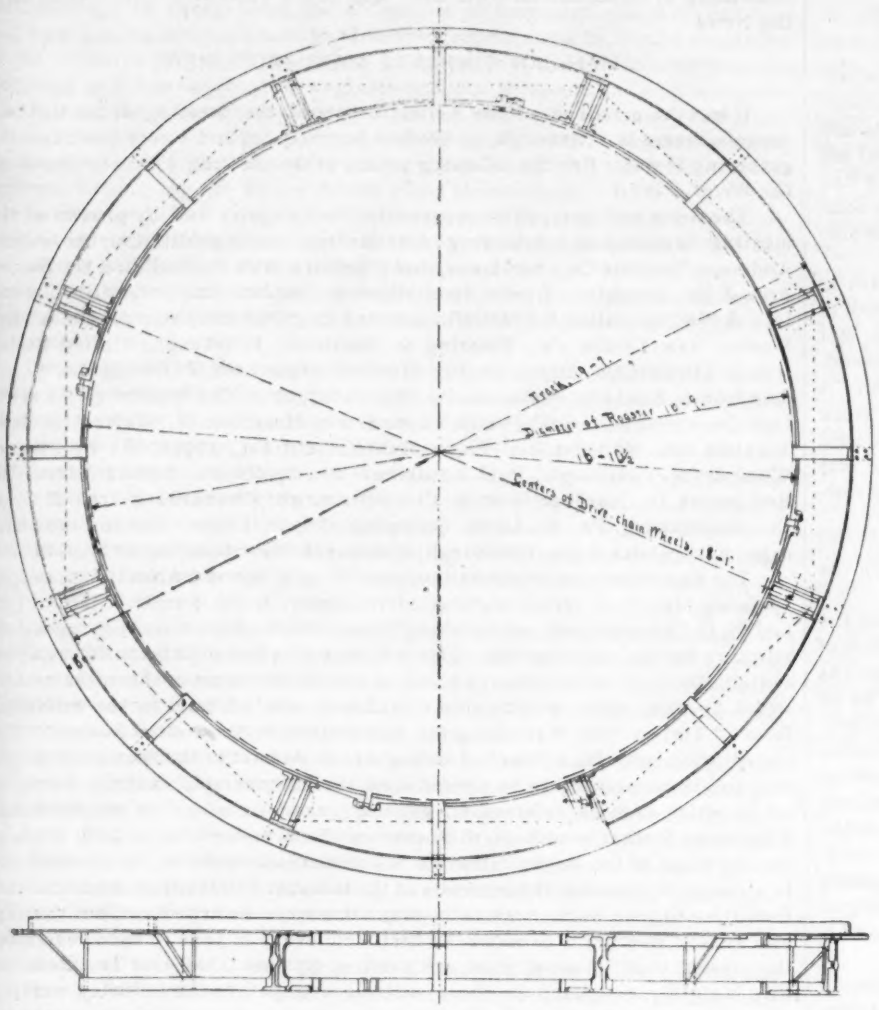
The officers chosen for the current year, and to hold their offices until their successors are elected and qualified, are as follows: President, J. W Britton, Cleveland; Vice-President, John Z. Speer, Pittsburgh; Secretary, Warner Arms, Niles, O; Treasurer, Alfred Marshall, Philadelphia. The Board of Managers consists of the foregoing, together with P. H. Laufman of P. H. Laufman & Co., Pitttsburgh; D. M. Somers, of Somers Bros. & Co., Brooklyn, and F. G. Neidringhaus, of St. Louis Stamping Co., St. Louis. The official headquarters of the association were declared to be at the business office of the President.

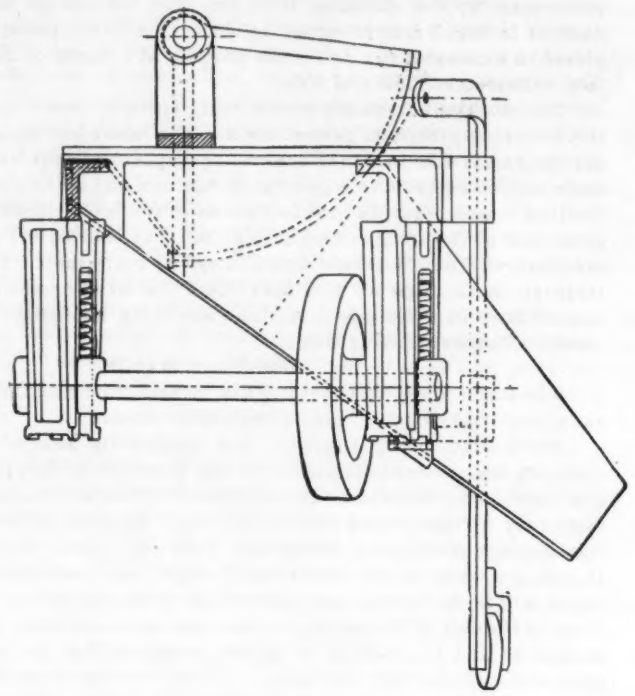
At the session, Wednesday afternoon, A. O. Kittredge, editor of *The Metal Worker*, read a paper of practical ideas and suggestions on the "Needs of the American Consumer," being a plea for more rational nomenclature and system of grading tin plates than at present exists. At the close of this paper a vote of thanks was passed, and remarks in discussion of certain features of it were made by a number of the gentlemen present. Subsequently the paper was referred to the Board of Managers with the suggestion that a definite plan of action in the matter of tin plate gauge designations, nomenclature, etc., be formulated and submitted at the next meeting for discussion and approval.

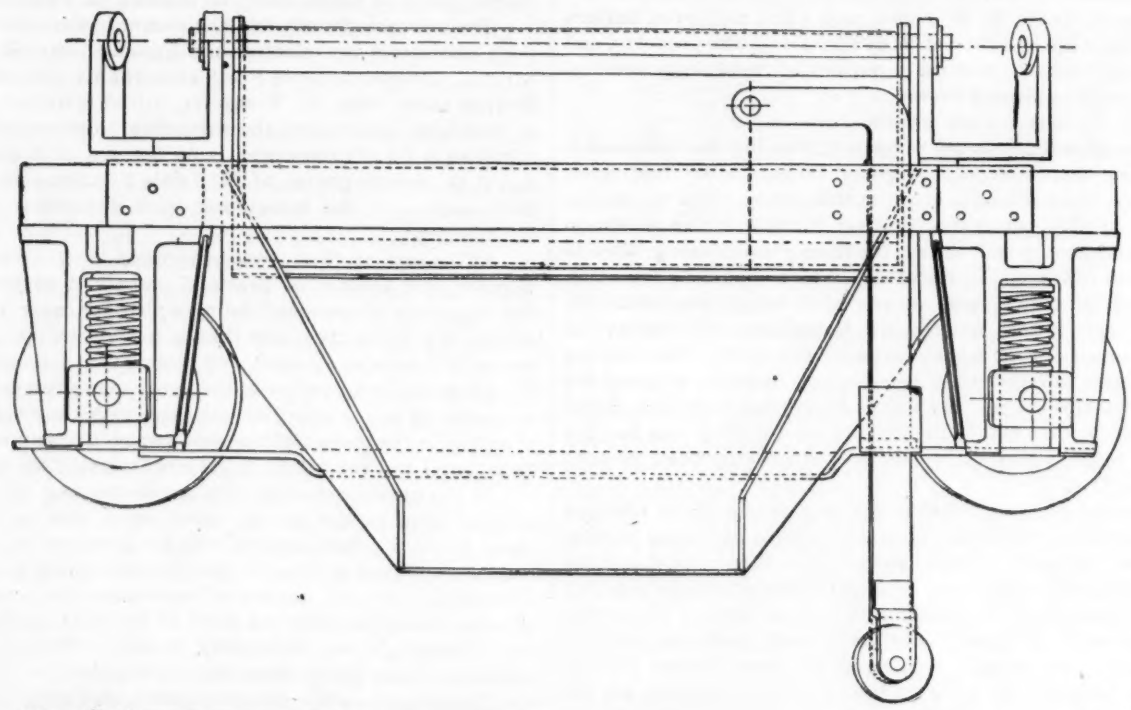
At the evening session Mr. Cronemeyer and Mr. Laufman, who entertain original ideas on the points raised, were also requested to formulate their plans and to file their reports with the Board of Managers, to the end that the simplest and best system for marking and naming American tinplate may be developed. The only matter of importance that came up at the evening session was fixing the date and place of the next meeting, which is Hotel Anderson, Pittsburgh, on Wednesday, June 17. The time was occupied by a comparison of notes by the manufacturers present. On request of the chairman, Mr. Kittredge, in a few remarks, gave a bird's-eye view of the new tin plate industry as he had found it in the course of a long trip from which he has recently returned, and in which he visited nearly all the tin plate works. An adjournment was taken at about ten o'clock.

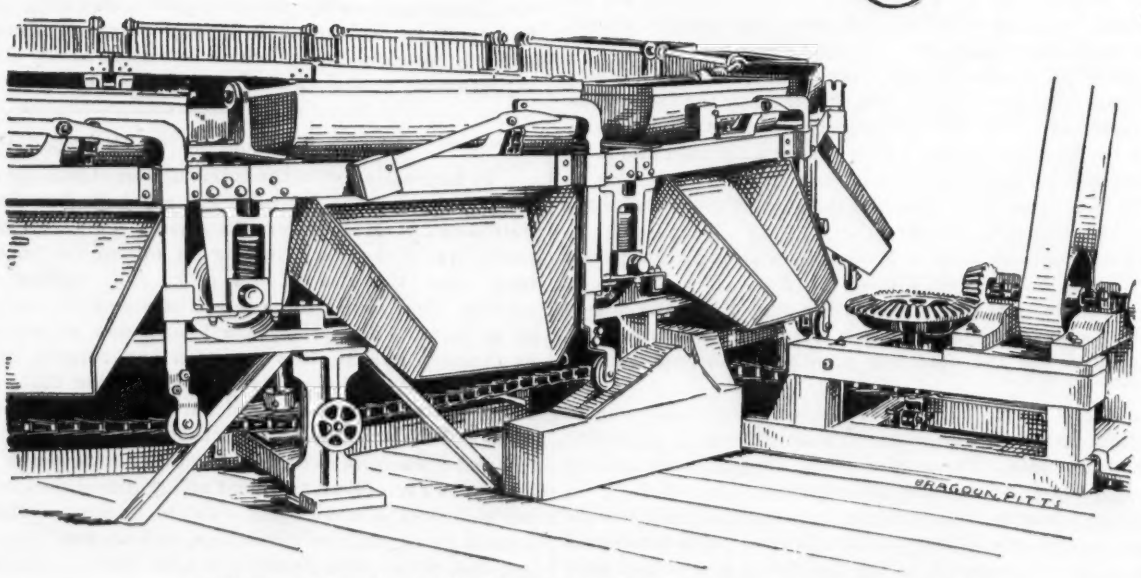
Machine for Making Steel Balls

In connection with the introduction of ball bearings for machine tools an ingenious machine for rolling steel balls has been invented by Charles Fairbairn, of Manchester, England. This machine is provided with two horizontal disks, each having on one of its faces a spiral groove starting from near the rim of its disk, and ending near its center, with a feeding rim round the edges, the shape of the groove being half round in section. These disks are placed one above the other, with their faces in contact, and in this position are rotated in opposite directions. In the center of the lower disk there is a hole through, and the spiral groove ends in this hole. If a heated bar of steel is presented with its end to the disks so that it enters between them, the feeding rims in the disks grasp the rod and draw it forward until the outer ends of the spirals meet at the end of the bar at each revolution, and acting like shears, cut off a short length of the bar sufficient to make a ball. By the rotation of the disks the steel is rolled around in all possible directions, and at the same time compressed in the grooves, which ultimately give a perfectly globular shape to the steel and deliver it to a hole, through which the perfected ball drops from the machine. —[London Engineer.









ROTARY CONVEYOR FOR HOT ORES FROM ROASTER. (See opposite page.)

ROTARY CONVEYOR FOR HOT ORES FROM ROASTER.

The accompanying illustration is from a photograph and drawing of an ore conveyor recently designed for the Croton magnetic iron mine, Brewster, N. Y, and manufactured by the Jeffrey Manufacturing Co., Columbus, O., with details from drawings.

There are several peculiarities of construction in this conveyor that are of interest and novel in their features, and are intended as an improvement upon machines of this class, especially so in the arrangement of driving gear. The machine consists of a series of buckets arranged in the form of a polygon and so constructed as to run on a circular track, the frame of the machine and the track being concentrate with and surrounding the roaster tower. The buckets are so arranged as to be dumped at any desired point when the machine in rotating should bring each to a desired position. In operation, the roasted ore is raked from a kiln with openings for that purpose, and is loaded on to the conveyor in the buckets as they are passing around the tower, the machine traveling on with its load until the loaded bucket is brought to the delivery point, when it deposits its load by means of a simple, automatic trip. The side of the bucket, which is a quarter circle in section, is raised so that the ore falls out by gravity. Each bucket is calculated to contain, when fully loaded, approximately 250 pounds each of ore, making the capacity very liberal for the handling of any amount of ore that would probably pass through any roaster. All of the parts of the frame and the arrangement of position of the drive gear are so placed that the heat from the ore, which is sometimes as high as 500°, will have very little, if any effect from expansion and contraction upon any of the working parts. All of the working parts are so protected that no ore can possibly come in contact or clog them in any way. By an arrangement of adjusting screws for tightening the drive chain and pulley chain (shown in detail of drawing) is such that the motion of the machine must be in a circular concentric with that of the tower. In the construction of this machine, the circular track upon which it traverses, was arranged with a guide flange, with small friction wheels calculated to impinge upon the outer surface thereof and guide the machine in its circular movement. This guide flange on the circular track has been found in practice during the operation of the machine on trial, not to be necessary, as the manipulation of the adjusting screws held the machine so closely in its concentric track that there was not the variation of a half-inch in the movement of the machine around a circle of 22 feet in diameter.

We present in detail a plan and elevation of the stationary track frame of the conveyor, showing the driving arrangement of the moveable frame. It will be noted that the chain runs in the form of an eight-sided polygon. We also show in detail one section of the moving frame, showing the position of the wheels that traverse the track, also an end elevation of the bucket and trip arrangement. The trip wheel on the end of the perpendicular rod, shown in drawing, rolls up an incline at the desired point of dumping. The incline now shown in sketches. This action raises the outer side of bucket, leaving an opening between the slope of the delivery chute and the bucket through which the ore falls into the angular chute projecting from the side of the frame. It will be noticed that the bottom of the chutes projecting from the frame are so arranged in relation to the traversing mechanism, that they form a section of cone, all their lines running to an apex from the center of the circle, thus forming a brace sustaining the inner frame of its position. The radial shafts carry one truck wheel each near the outer circle of the frame. These shafts are arranged in boxes and the frame is supported upon them by springs, as shown. This enables the shafts to line themselves automatically, each shaft with its opposite shaft on the other side of the polygon, thus compensating for any inequalities in the circular track, also preventing any jar or strain upon the frame, rough places or inequalities of load.

Referring to the photographic view in perspective, it will be noted that the eight vertical shafts contained in the drive gear have upon each one two sprocket wheels. The upper wheels of these pairs are surrounded by a chain to which are connected pulling rods with adjustable turn buckles, one end of said rods being fastened to the chain and the other to the moveable frame underneath the delivery chutes. The drive chain proper, encircles the lower system of sprockets and is brought out between two of them over idlers to another vertical shaft upon which is placed a bevel wheel mashing into a bevel pinion on the horizontal shaft. The outer end of the horizontal shaft is provided with a pulley to which power is attached. In operation, the motion imparted on the pinion shaft is transmitted to the vertical shaft from the bevel wheel and by the chain encircling the eight driving wheels gives motion to the eight vertical shafts, and in turn transmits their movement to the pulling rods, moving the whole apparatus simultaneously. The pulling rods extend from the pulling chain, take power from the motor chain and are so arranged as to compensate for the inequalities of pull between the shorter diameter of the octagon and the longer diameter at the points over the wheels. It is found that the motion is perfectly true and smooth at all points of the circle, the whole machine really being a large sprocket wheel of 22 feet in diameter, without any central shaft.

This form of conveyor adapted to the special purpose of encircling ore roasters, is but one of the many machines of this class manufactured by the Jeffrey Manufacturing Co., and this drive, adapted as it is to this machine, is a feature in the drive of their horizonal conveyors calculated for large capacity and intended to run in a horizontal plane, transporting their load around curves in order to distribute such material as they may convey over a large area of surface as is instanced in distributing coal over a large storage yard from one receiving point along a straight line of bins, perhaps across a driveway or street, making a wide distribution over a large storage space of a large quantity of material with but one handling and at little expense, such conveyors being constructed of a capacity of three or four hundred tons per hour, at a very low speed, not to exceed 75 feet a minute, the delivery of the material being very gentle and devoid of any dash or throw. This system of conveyors doing away with the former method of delivering the material from one conveyor along a line into others running at right angles, and from thence into storage spaces, relieving the material from the breakers consequent from two or more deliveries, and accomplishing the results with one occasion for breakage.

Any information in reference to these machines or others of the class, will be cheerfully furnished on application to the Jeffrey Manufacturing Co, Columbus, O.

IRON PRODUCTION IN NOVA SCOTIA.

It is so far satisfactory to know that efforts are being made to place the iron-producing industry in better proportion to the consumptive requirements of the country. In our last issue were particulars of an additional furnace, 75 feet high and 19 feet bosh, just lighted by the Londonderry Iron & Steel Co. And to-day we learn that a large proportion of the bonds of the New Glasgow Iron, Coal & Railway Co. having been taken up—$400,000 out of the total issue of $500,000, we are told—the directors have entered into contract for furnace plant. Our informant says that the directors are sanguine of being able to produce pig iron before Christmas. And they speak of beginning the erection of a second as soon as the first is finished and in operation. It would seem, however, the part of wisdom for them, before equipping a second furnace, to give some attention to the completion of their railway, by which the deposits of ore and of limestone on the company's property are to be reached. The amount of capital the directors have at command will hardly permit them to launch out on so large a scale as that foreshadowed, and it might be better to proceed cautiously.

There is in active operation at New Glasgow also, a forging establishment, producing railway axles, shafting, etc. It also uses the Siemens-Martin process in the production of plough steel, tool steel, etc. These works, which are being carried on by the Nova Scotia Steel & Forge Co., Limited, are said to have shipped to Montreal and points West, during the past year, about 13,000 tons of finished steel. We learn from a gentleman just returned from Pictou county, that these works employ about 450 men, consume from 30,000 to 36,000 tons of coal, and pay out in wages from $150,000 to $160,000 per annum. It is well to know that they have capacity to turn out steamboat shafts from 16 to 18 inches in diameter and 22 feet long, as well as cranks and other heavy forgings in proportion. For a French steamer of somewhere between 4,000 and 5,000 tons register, which was towed into Halifax harbor disabled a couple of weeks ago, a new stern frame and rudder is required, implying very heavy forgings 40 or 50 feet in length. These are being supplied at this establishment, and the repairs to this big ship will occupy some six or eight weeks.—[Toronto Monetary Times.

A Leading Cincinnati Industry.

The business for many years carried on under the name of Samuel C. Tatum & Co., Water, John and Front streets, Cincinnati, O, was on March 7th, under articles of incorporation, authorized by the laws of Ohio, changed to and will, from the time here noted, be known as The Samuel C. Tatum Co. The business will be carried on under the same management with the following officers: S. E. Hillis, President; W. S. Mendenhall, Vice-President; W. O. Burgess, Secretary.

What has been for many years known in Cincinnati, and in a large territory in many adjoining States as Samuel C. Tatum & Co., is one of the old firms still continuing in business. The new company, like the old, are quite extensively engaged in the manufacture of several very nice and useful specialties, some of which have been noticed in illustrated articles in several issues of *The Iron Trade Review*, and in particular in the special issue of this paper of December 18, 1890. The article illustrated in the issue referred to is known as Tatum's catalogue file, and is very useful in all offices of mercantile and manufacturing houses for filing all such papers as relate to prices and discounts and other papers which parties may have occasion to look over from day to day. Where it has been known and used this catalogue file has given, and still continues to give, very great satisfaction, and the demand for same is increasing as it becomes better known. This company, aside from their line of specialties, are doing a very large business in making many kinds of castings, and are prepared at all times to fill orders for any needing anything in that line. While in all sections of the country some are complaining of business being dull, this company have been in the passing months very busy, having all they can do, and this condition of affairs still continues.

A Safe Investment.

There is nothing in the history of this country more remarkable than the process of development that is now going on in some of the Southern States, including Georgia, Alabama, Tennessee and Texas. Millions upon millions of dollars are being invested in Southern enterprises by Northern capitalists, and the returns are so enormous as to be almost incredible; but the facts and figures in regard to them are so well established as to be beyond dispute. Take, for instance, the Elyton Land Co., of Birmingham, Ala., which has been paying out dividends at the rate of $1,000,000 per annum on an original investment of only $100,000. Conservative financiers, who have looked over the ground, have said that still more remarkable results will be arrived at by the undertaking of the Georgia-Alabama Investment & Development Co. at Tallapoosa, Ga. Its affairs are not in the hands of boomers who have done so much to injure the South, but in the hands of some of the foremost financiers and business men of the country. There is no doubt but this is one of the best and saftest money-making undertakings now offered to the investor. Readers of this paper who have money to invest are strongly advised to secure some of the stock of this company without delay. It is absolutely as safe as United States government bonds, and will pay as much interest at once. Room 720 Insurance Exchange Building, Chicago, Ill.

PRODUCTION OF MANGANESE ORES IN THE UNITED STATES.*

BY JOSEPH D. WEEKS.

The ores of manganese may be divided into three general classes: (1) manganese ores; (2) manganiferous ores, and (3) argentiferous manganese ores. The dividing line between the first two grades is taken at 70 per cent. binoxide of manganese, equal to 44.252 per cent. metallic manganese, this being the standard of shipments to English chemical works. All ores containing at least this amount are classed as manganese ores; those containing a less percentage of manganese, containing also more or less iron, are classed as manganiferous iron ore. In the third class are included the argentiferous manganese ores of Colorado, which are utilized chiefly for the silver they contain. They have an added value, however, by reason of the fluxing qualities imparted to them by the presence of manganese and iron.

By far the larger proportion of manganese produced in the United States is mined in three localities: Crimora, Va., Cartersville, Ga., and Batesville, Ark. Of the 23,927 tons of manganese produced in the census year (the long ton of 2,240 pounds is used in this report), 20,325 tons were from these three districts. Manganese is found, however, in many places in the United States. For example, all along the western slope of the eastern ridge of the Appalachian range from Maine to Georgia more or less manganese has been mined. There is also considerable manganese found associated with the hematite ores of the Lake Superior region, and in Arkansas southwest from Batesville. With few exceptions, however, the deposits are small, and the indications are not such as to justify the expenditure of large amounts of money in mining and washing plants, which are usually necessary in the economical production of manganese. From one locality in Vermont, however, considerable manganese has been produced, and there are mines in Virginia along the Shenandoah valley and its southern extension, as well as on the upper James, at which considerable manganese was produced in 1890, and which it is believed, will add largely to its production in this country in the near future. A similar statement can be made of mines in Georgia.

The following table shows the general status of the industry in 1889:

States.	Production. Long tons.	Total value.	Value per ton.	Employes.	Wages.	Capital. (b)
Arkansas	2,528	$23,173	$ 9 17	96	$33,191	$1,200,000
California	53	901	17 00	10	1,149	2,400
Georgia	5,208	50,143	9 63	117	19,486	175,125
Nevada	15	83	5 53	2	53	600
North Carolina	17	170	10 00	2	60	250
South Carolina	124	744	6 00	6	400	5,000
Tennessee	30	120	4 00	3	70	100
Vermont	1,336	7,348	5 50	25	3,510	(a)
Virginia	14,616	156,257	10 69	171	65,939	711,000
Total	23,927	$238,939	$9 99	432	$123,858	$2,091,475

(a) Included in Virginia.
(b) This item includes estimated value of mineral right as well as capital actually invested.

In the preceding table is included a very small amount of ore, which, under strict classification, would be regarded as manganiferous iron ores, but as the metallic manganese in but few cases falls below 40 per cent. they are all reported manganese ores. Less than 1,000 tons of ore fall below 44 252 per cent. of metallic manganese, and the average of the whole 23,927 tons is above this percentage.

Certain explanations of these statistics are necessary to prevent wrong deductions or conclusions. In but four instances at the most is manganese ore mining prosecuted in the United States with anything like regularity, and in but two of the four was mining continuous. At the works producing the largest amount of manganese in Georgia the mines were operated but 190 days in the year, while at the Vermont mine during a large proportion of the year but little work was done. At one mine in Virginia and one in Arkansas the mining of manganese is fairly continuous. At most of the other works the production reported has been from very irregular workings, and chiefly for the purpose of testing the character of the deposit. This it true of all the production of Tennessee, North Carolina, South Carolina and Nevada, while the California production is from an old mine, worked occasionally to meet a small demand for manganese for the purpose of making chlorine gas in working sulphuret ores.

From the preceding table it will be seen that 61 per cent. of the manganese produced in the United States was from the mines of Virginia. Of this production 12,974 tons were from the well-known Crimora mine and the opening adjoining it, known as the Old Dominion mine. More manganese has been taken from these two mines, which are practically the same deposit, than from all the rest of the United States, and it is probably fair to say that this deposit has produced more than any other mine in the world. The grade of the ore is somewhat above the limit dividing manganese and manganiferous iron ore, the average shipments for 1889 showing 46 per cent. metallic manganese.

Georgia stands second in point of production. Of the 5,208 tons produced in this state in 1889, over 4,000 tons were from the mines of one company.

Arkansas stands third in point of production, and here again by far the larger proportion of the ore produced was from one mine. The fourth State in point of production of manganese was Vermont, 1,336 tons being produced from one mine.

A large proportion of the hematite ores of the United States carry more or less manganese. While in most cases the amount of manganese in these ores does not increase their value over what the same ores would be worth as iron ores were the manganese absent, they, however, make the ore more desirable for certain purposes. No attempt has been made to collect the statistics of these manganese-bearing iron ores except in cases where the manganese in them has added somewhat to their value.

A product of 31,343 tons of ore, containing on an average nine per cent. of manganese, is reported from Michigan, and a further product of 50,018 tons of ore, containing 6.74 per cent. of manganese, is reported for the same State, making a total of 81,359 tons of iron ore produced in Michigan, containing sufficient manganese to make it desirable to be mined. The value of this ore is reported at $4 54 a ton.

Returns of the production of 17,550 tons of manganese-bearing silver ores have been received, all from Colorado. The manganese in these ores makes them desirable as fluxes. Nearly all the argentiferous iron ores mined from the upper workings of the Leadville deposits carry manganese in varying quantities from five per cent. up to 25 per cent. and occasionally 30 per cent. to 35 per cent. with five to 20 ounces of silver, 0 to four per cent. of lead, seven per cent. to 18 per cent. in silica, and 30 per cent. to 50 per cent. of iron. It has been estimated that from 300 to 500 tons of this ore are produced per day. On the basis of the lowest figures—that is, 300 tons a day, for 300 days in the year—the production of argentiferous manganese ore in the Leadville district would be 90,000 tons, but, as stated above, the total detailed reports received of this production are for only 17 550 tons.

These ores are sold to the smelters for fluxing the silicious silver ores, and are usually paid for according to the silver contents—that is, so much per ounce of silver—without reference to the manganese contained therein. In some cases the value of this ore has been placed at $3.50 a ton for its contents of iron and manganese.

The production of manganese from 1880 to 1889, has been as follows:

PRODUCTION OF MANGANESE ORES IN THE UNITED STATES SINCE 1880.

States	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.
Virginia	3,661	3,295	2,982	5,355	8,980	18,745	20,567	19,835	17,646	14,616
Arkansas	.....	100	175	400	800	1,483	3,316	5,651	4,312	2,528
Georgia	1,800	1,200	1,000	.....	.....	2,580	6,041	9,024	5,568	5,208
Other States	300	300	375	400	400	450	269	14	1,672	1,575
Total	5,761	4,895	4,532	6,155	10,180	23,258	30,103	34,524	29,198	23 927

This table shows the production of what may be strictly regarded as manganese ores in the classification above given. It has been impossible in some cases to separate the manganese and maganiferous ores which are the product of a given mine, but where the total production of State or mine averages more than 44.252 per cent. of metallic manganese its production is regarded as manganese ores.

*Abstract of Census bulletin No. 68.

Extent of the Tinplate Surplus.

The latest circular issued to the trade by Charles S. Trench & Co., tinplate importers, No. 54 Cliff St., N. Y., cautions buyers not to be misled into believing that the surplus of tinplate imported before July 1, will be enormous. They present figures to show that the stocks here on January 1, 1891, were small. The importations during 1889 were 5,650,000 boxes. The following figures are also given:

	1889.	1890.	1891.
Shipments January 1 to May 1, boxes	2,050,000	1,350,000	2,475,000
Add May shipments, boxes	616,000	508,000	*700,000
Total to May 31, boxes	2,666,000	1,858,000	3,175,000

*Estimated.

The shipments to the end of May this year, therefore, will be but 1,217,000 boxes more than last year, and on 509,000 boxes more than in the same months in the year before. Messrs. Trench & Co. feel, therefore, more positive than ever that at the utmost the stock of tinplates in America on July 1, will not exceed two and a half months' average consumption. The point sought to be made is that buyers must not expect too great a fall in prices in consequence of surplus stocks.

The extra cost for duty on importations after that date is estimated at $1 30 per box for IC 14x20; $1 64 for IX 14x20; $2 60 for IC 20x28; $3 28 for IX 20x28, and other sizes in proportion.

The lowest prices on record (in England) plus the McKinley duty must be the basis that will be reached sooner or later, say Messrs. Trench & Co. After July, said a circular from the same house, dated April 18, "the makers in getting rid of their surplus will undoubtedly have to accept what will appear as very low prices compared with prices ruling a month ago. It will be no great hardship, however, as they have large margins of profits to cut prices on."—[Hardware.

A Greater than Eiffel.

Some fresh details have reached us respecting the proposed new London Tower, which is to excel, in some respects, the famous Eiffel structure, and with which the name of Sir Edward Watkin is closely identified. The share capital of the company which has been formed to carry out the project is, we learn, to be divided into two categories—the estates capital and the tower capital. The former, amounting to about £70,000, chiefly subscribed by shareholders in the Metropolitan Railway, is to be devoted mainly to the purchase and laying out of 121 acres of land and the putting in of the foundations of the tower. The latter, probably £300,000, will be for the construction of the tower itself, which is to be built of steel. Sir Benjamin Baker, the company's engineer, estimates that the foundations will cost about £5,000, or one-fourth of the cost in the case of the Eiffel Tower, where, however, very bad ground had to be dealt with.—[Glasgow Engineer.

The Philadelphia (Natural Gas) Company.

The annual report of the Philadelphia Co., of Pittsburgh, for March 31, 1891, shows that the company paid dividends to the amount of 6 per cent. upon the capital stock; invested $128,257.16 in meters and regulators; laid 68,385 feet of new 36-inch riveted steel mains at a cost of $714.290.59 during the past year. A considerable sum was also expended in taking up and relaying the smaller mains which were in use during the period of high-pressures and are now available for extending the company's distributing system. The debt of the company is about $1 551,000, but if it were to sell such of its assets as could be made immediately available, it would leave only an indebtedness of $188 000. The company is considering the advisability of supplementing its natural gas supply by the manufacture of fuel gas.

Price of Stock **TO BE ADVANCED** Wednesday, July 1.

A Safe Investment,

EARNING 35% PER ANNUM

Semi-Annual Dividends April and October.

STOCK OF THE

Ga.-Ala. Investment & Development Co.

Capital Stock, $4,500,000. Shares, $10 each, par value, full paid and Subject to no Assessments.

Gen. BENJ. F. BUTLER, of Massachusetts - - - President

Hon. JAMES W. HYATT, Late Treasurer of U. S. - - Treasurer

DIRECTORS.

Gen. BENJ. F. BUTLER, of Massachusetts.
Hon. LOGAN H. ROOTS, of Arkansas.
Hon. A. U. WYMAN, ex-Treas. of U. S., of Neb.
Hon. JAS. W. HYATT, ex-Treas. of U. S., of Conn.
C. W. PERKINS, Cash. Mass. Nat'l Bank, Boston.
GEO. C. SCOFIELD, Pres. N. Y. Con. Co., of N. Y.
THOS. C. SMITH, Pres. 17th Ward Bank, Brooklyn.
L. M. SANFORD, Pres. Bank of New Castle, of KY.

ADVISORY BOARD.

Hon. JOHN B. GORDON, ex-Governor of Georgia.
Hon. ROBERT L. TAYLOR, ex-Governor of Tenn.
Hon. J. B. FORAKER, ex-Governor of Ohio.
Hon. RICH. H. BRIGHT, of Washington, D. C.
Hon. E. F. MANN, Supt. C. & M. R. R., of N. H.
E. R. TRUE, Cash. U. S. Treas, Washington, D. C.
HENRY FEUCHTWANGER, member N. Y. Stock Ex.
P. K. ROOTS, Cash. 1st Nat. Bank, Little Rock, Ark
F. ROBERTSON, Pres. 1st Nat. Bank, Kearney, Neb
Hon. D. C. SCOVILLE, of New York City, N. Y.

SUFFOLK TRUST CO., Transfer Agents,
EXCHANGE BUILDING, BOSTON, MASS.

THE PROPERTY OF THE COMPANY CONSISTS OF

FIRST. 8000 City Lots, or 2022 acres of land in the city of Tallapoosa, Haralson county, Georgia, the residue remaining unsold of 2500 acres, on the centre of which the city was originally built. Estimated value on organization of company Oct. 1, 1890, $1,084,765, but largely increased in amount and present value since that time by additional purchases of city lands and improvements and development added.

SECOND. 2458 acres of valuable mineral land, adjacent to the city of Tallapoosa, all located within a radius of six miles from the centre of the city. Present value, $122,900.

THIRD. The issued Capital Stock of the Georgia, Tennessee & Illinois Railroad Company, chartered for the purpose of building a railroad from Tallapoosa, Ga., to Stevenson, Ala., 120 miles, that will net the company nearly $2,000,000 of the capital stock of railroad paying 7 per cent. dividends.

FOURTH. The Tallapoosa Furnace, on the line of the Georgia-Pacific Railroad, in the city of Tallapoosa, Ga.—the said furnace being of 50 tons capacity, manufacturing the highest grade of cold and hot blast charcoal car-wheel iron. Present value, $250,000.

FIFTH. The Piedmont Glass Works, situated on the line of the Georgia-Pacific Railroad, in the city of Tallapoosa, Ga., said plant being 12-pot furnace capacity, and manufacturing flint-glass flasks and prescription ware. Present value, $100,000.

SIXTH. The Tallapoosa Reclining Chair Factory on the line of the Georgia-Pacific Railroad, in the city of Tallapoosa, Ga., manufacturing hammock, reclining and other chairs. Present value, $25,000.

SEVENTH. Sundry interest bearing bonds, notes, mortgages, loans, stocks, &c., acquired since the organization of company in securing the location on its property of new manufacturing industries and from sales of its city lots and cash in bank, received from the sale of treasury stock for improvements not yet invested.

There is already located on the property of the company, in the city of Tallapoosa, from 2800 to 3000 inhabitants, three-quarters of whom are Northern people, who have settled there within the last three years, about 700 houses, 40 business houses and blocks, public parks, free public schools, churches, hotels, water works, electric lights, $75,000 hotel, now building, to be open in October. Street railway and 12 new manufacturing industries, under contract and building that will employ fully 1000 additional operatives, requiring 500 new dwelling houses, and increase the present population of the city from 3500 to 5000.

THE INCOME OF THE COMPANY.

Will be derived principally from six sources:

FIRST. Earnings of its manufacturing establishments, now in operation and to be built (now $76,235 04 yearly).

SECOND. Rentals of its farming lands and sales of timber in "stumpage" (estimated $3000 yearly).

THIRD. Sales of its city lots in Tallapoosa, Ga., for improvement and investment (estimated $250,000 yearly).

FOURTH. Working of its mines and quarries, by themselves or on "royalties" (estimated $10,000 yearly).

FIFTH. Profits on mineral, timber and town site options and purchases on line of Georgia, Tennessee & Illinois R. R. (estimated $50,000 yearly).

SIXTH. Earnings of stock of Georgia, Tennessee & Illinois R. R. (estimated $186,408 yearly).

Total estimated yearly income of company after construction of railroad, $525,633.04.

Total estimated yearly income of company prior to construction of railroad, $339,235.04.

PRESENT PRICE OF THE STOCK $3.50 PER SHARE.

TO BE ADVANCED JULY 1 TO $3.60 PER SHARE.

And further advanced Aug. 1 to $3.70, Sept. 1 to $3.80, Oct. 1 to $3.90, (and October dividend, semi-annual, probably 20c. per share), Nov. 1 to $4.00, Dec. 1 to $4.10, and Jan. 1 to $4.20 per share, when it is intended to advance the price to par should any stock remain unsold.

Right Reserved to withdraw stock from sale without notice after July 1, or when 50,000 shares are sold.

The Directors of the **GEORGIA-ALABAMA INVESTMENT AND DEVELOPMENT COMPANY** have decided to offer to the public until Wednesday, July 1, a limited amount of the full paid capital stock of the company at $3.50 per share (par value $10.00).

This stock is full paid, and subject to no future assessments under any circumstances.

One million dollars of the $4,500,000 capital stock has been placed in the treasury of the company for the development of its properties, and the enhancement and protection of the interests of the stockholders.

At 12 o'clock midnight, July 1, 1891, the price of the stock of the company will be advanced to $3.60 per share, and further advanced on the first day of each month following, the sum of not less 10 cents per share until Jan. 1, 1892.

A stated advance monthly in the price of the stock has been decided on by the company for the reason that the recent location on its property of several extensive manufacturing establishments employing over 1000 skilled operatives, makes such a policy fully warranted on account of the increased values added to its assets.

The company reserves the right to advance the price of the stock more than 10c. per share per month or withdraw it entirely from sale at any time after July 1, the sales of stock and added developments shall render such action necessary for the protection of the interests of the stockholders.

Under the plan of the organization of the Company all receipts from the sale of the Treasury Stock of the Company are expended at once for improving and developing the property of the Company, increasing its assets to the extent of the amount received.

The entire properties of the company being paid for in full, all the receipts from the sale of city lots go at once to the dividend fund of the company, in addition to the earnings of its manufacturing establishments in operation and its income from other sources.

The stock of the company will not only earn gratifying dividends for the investor, but will increase rapidly in the market value, with the development of the company's property.

The stock will shortly be listed on the New York, Chicago, Philadelphia and Boston consolidated stock exchanges.

Orders for stocks will be filed as received, in any amount from one share upward, as it is desired to have as many small holders in all sections of the country as possible, who will, by their interest in the company, influence emigration to Tallapoosa, and advance the interests of the company.

Stock Sold on 2 per cent. commission, or purchased at price paid and 17 1-2 per cent. per annum profit.

For the accommodation of the stockholders of the Company, who desire to realize on their stock prior to its being listed on the Exchanges, and have not a ready market for it in their own locality, the Company have completed arrangements with a syndicate of the largest English and American stockholders to handle for a nominal commission, and buy and resell to other investors, all stock purchased of the Company. This syndicate will handle the stock at the Company's selling price, for a commission of 2 per cent., remitting to the stockholder the full amount received for same, less the commission of 2 per cent. for transacting the business, or will, if the stockholder prefers, cash the stock at any time after the first day of the month following the next advance succeeding the purchase at the price paid by the stockholder for the stock, and five cents per share (17½ per cent. per annum) additional added for each and every month thereafter until January 1st, 1892,

Stockholders wishing to sell stock purchased, can send it to the Treasurer of the Syndicate, the Suffolk Trust Company, Bankers, Transfer Agents, or to the Company direct at Boston, Mass., to be sold at the Company's selling price, less 2 per cent. commission; or if immediate cash is preferred, they will receive a check for the stock at the price paid the Company for it, and an advance of 5 cents per share added for each month it is held by them as above, without delay, on presenting their certificates of stock by mail or in person, indorsed in blank on the back of the certificate; and in view of the fact that the advance paid by the Syndicate to the person selling, when immediate cash is required is but one-half the actual advance of the stock thus affording a handsome profit for them to hold and resell at advanced prices, *the Company guarantee in selling all stock that a check as above shall in all cases be returned to parties desiring to sell without delay.*

4 ADVANTAGES ON THE STOCK AS AN INVESTMENT.

PRINCIPAL absolutely secure under all circumstances, the property being paid for in full.
DIVIDENDS, to include earnings and all receipts from sale of city lots, paid regularly, Apr. and Oct.
PROBABILITY of a large increase in each semi-annual dividends by increased earnings and sales.
CERTAINTY of a rapid increase monthly in the intrinsic value and selling price of the stock itself.

Until Wednesday, July 1, 1891.

$ 7	will purchase	2 shares or	$20 par value of stock.
14	will purchase	4 shares or	40 par value of stock.
35	will purchase	10 shares or	100 par value of stock.
70	will purchase	20 shares or	200 par value of stock.
105	will purchase	30 shares or	300 par value of stock.
210	will purchase	60 shares or	600 par value of stock.
350	will purchase	100 shares or	1000 par value of stock.
525	will purchase	150 shares or	1500 par value of stock.
1050	will purchase	300 shares or	3000 par value of stock.

Checks for the April dividend, which included earnings of the Manufacturing Establishments owned by the Company, and receipts from the sale of City lots, for the first six months of business, were mailed April 15, and checks for the Oct. dividend will be mailed to stockholders by the Suffolk Trust Co., Transfer Agents, Oct. 15.

No orders will be received at the present price of $3.50 per share after 12 o'clock midnight July 1, and all orders for stock should be mailed as soon as possible, and in no event later than several days prior to that date to insure delivery at present price of $3.50 per share.

Address all orders for stock and make checks, drafts or money orders payable to

Hon. JAMES W. HYATT, Treasurer Georgia-Alabama Investment & Development Co.

720 INSURANCE EXCHANGE BUILDING, CHICAGO, ILL.

Southern Offices, Tallapoosa, Haralson County, Ga. **New York Offices**, 11 Wall St., Rooms 31 and 32. **Boston Offices**, 244 Washington st., Rooms 8, 9 and 10. **Philadelphia Office**, Room 944 Drexel Building. **Chicago Office**, Room 720 Insurance Exchange Building. **Baltimore Office**, Room 4, Bank of Baltimore Building. **Foreign Offices**, No. 2 Tokenhouse Buildings, London, Eng.

☞ **80-page Illustrated Prospectus of Tallapoosa, Stock Prospectus of Company, and Plat of City, with Price List of Building Lots, Mineral Maps of the Section, Engineers' Reports, &c., mailed free from any of the above-named offices of the company.**

Manufacturng Industries Now Building or under Contract to Locate at Tallapoosa, Ga., Secured by the Company Since the Return of the Excursion to Tallapoosa, March 1, 1891.

C. B. HITCHCOCK MFG. CO., from Cortland, N. Y., 2000 Lineal Feet of Factory Buildings, one of the largest Wagon manufacturing establishments in the world, to employ **400 to 600 hands.**

HAYES' CHAIR COMPANY, from Cortland, N. Y., 800 Lineal Feet of Factory Buildings, manufacturers of Fancy Rockers, Plush Chairs, &c., one of the largest in the U. S., to employ **125 to 200 hands.**

WM. HOWE VENTILATING STOVE CO., from Cortland, N. Y., 1100 Lineal Feet of Factory Buildings, manufacturers of the renowned Howe Patent Ventilating Stove and Ranges, to employ **125 to 200 hands.**

ANCHOR WOOLLEN MILLS, from Marysville, Tenn., 200 Lineal Feet of Factory Buildings, 2 stories, manufacturers of all kinds of Woolen Cloths, Blankets, &c., to employ **75 to 150 hands.**

BROWN BROS. & CO., from Atlanta, Ga., 75 Lineal Feet of Factory Buildings, 3 stories, manufacturers of Ready-Made Clothing, Jeans and Overalls, Underclothing, &c., to employ **50 to 100 hands.**

TALLAPOOSA STREET RAILWAY CO.; Capital, $25,000, now building, two miles of the line to be in operation by September 1.

TALLAPOOSA ICE MANUFACTURING COMPANY. Eight-Ton Artificial Ice Plant, to be in operation July 1.

IRON BRIDGE WORKS, 500 Lineal Feet of Factory Buildings, to employ **50 to 100 hands**, manufacturers of Iron Railroad and Highway Bridges.

CITY BOTTLING WORKS, from Wilkesbarre, Pa., to bottle the Lithia and Chalybeate Waters, in Lithia Springs Park, and introduce them throughout the United States.

BOOT AND SHOE FACTORY, Messrs. Horne & Boise, 3-story factory, manufacturers of all styles of boots and shoes, to employ **75 to 150 hands.**

FOUNDRY AND MACHINE WORKS, from Stanton, Mich., 100 Lineal Feet of Factory Buildings, manufacturers of Machinery, Engines, and Castings, to employ **20 to 40 hands.**

TALLAPOOSA SCHOOL FURNITURE CO., 100 Lineal Feet of Factory Buildings, manufacturers of School and Church Furniture and Fine Cabinet Work, to employ **25 to 50 hands.**

TALLAPOOSA LUMBER MFG. & R. R. CO., $250,000 Capital, 1100 Lineal Feet of Buildings. To erect Mills at Tallapoosa, and build a Logging Road into the timber south of the city to supply them with logs. Survey now being made, and under contract to commence road before July 1, to employ **150 to 300 hands.**

The above Manufacturing Industries will represent a combined frontage of over 5400 LINEAL FEET, OR OVER A MILE OF FACTORY BUILDINGS, *employ when completed from 1,000 to 2,000 operatives, according to the business done, and require 500 new dwelling houses erected at once.*

A GROWING CINCINNATI ENTERPRISE.

Some time ago Crawly & Johnston removed their office from 121 E Pearl street, to 125 same street, Cincinnati, O. This firm are general machinists and steam fitters in gas and steam engines and in fitting up machinery for steamboats, and all kinds of millwright and blacksmith work, and dealers in engine supplies. Aside from this general line they are dealers in some specialties, one of which is their Diamond Safety steam engine, which is simple in construction, and none but the best qualities of material are used in its various parts. The slides, journal boxes, and lower cylinder head are cast with the bed; these castings are examined with great care to see that they are free from imperfections. In building the engine all the other parts are examined with like care to be sure that each part is all right in every particular, so that when the engine goes out it will be as perfect as is possible to be made by any one in the business. This engine is strong and durable in every way, and takes but little room and easily handled, and are thoroughly tested under all conditions before being sent out and put up. This is a reliable engine, and so designed to regulate the steam in the most economical way and give the greatest power with the smallest amount of fuel. These engines are neatly painted, and fitted with very nicely polished oil cup, and are ready to send out whenever wanted. Any one wishing a small, perfect working and economical engine at a low price, will be pleased with the Diamond Safety steam engine. Another specialty of this firm is their Diamond Safety upright tubular boiler, made of iron of a tensile strength of 50,000 lbs. to the square inch, heads of firebox and cones are 60,000 lbs. and of steel. The entire length of flues are covered with water, an important item, and will be appreciated by all using the boiler. Another specialty is their plain vertical tubular boiler, made of like tensile strength of iron and steel.

These two boilers are well made in every particular and so put together as to secure all possible strength and do good work and be economical in fuel, and can be obtained at a comparatively low price. This engine and these two boilers were inserted in detail in an illustrated article in *The Iron Trade Review*. Another article of great utility of which this firm are making a specialty is the John Gates patent hydraulic steering apparatus. This has been in use for some ten years on the Columbia, Snake and Willamette rivers and the Pacific Ocean and British Columbia waters. This apparatus works noislessly and very easily kept in repair at a very small expense. It is very durable in every way, and will require less repairs, and more work can be done with it than any other steering apparatus now known and used or in the market. This firm have the exclusive right to make and sell this steering apparatus east of the Rocky Mountains. They have already put it on a number of boats, and the satisfactory results in the use of it have far exceeded the most sanguine hopes and expectations of those who have used it.

This firm are agents for L. J. Wing & Co.'s disc fans for ventilating, cooling and drying purposes, and are well adapted for factories, churches, schools, theatres and all other purposes where needed, large numbers of which are being made and sold, and where used are giving great satisfaction. Messrs. Crawly & Johnston have been engaged in business in Cincinnati five years; they are both young men and are practical and skilled machinists in their business. They have sold large numbers of their engines and boilers and are still doing so, and the demand increasing as they become better known.

Steel in America.

According to the statistics just published, the expansion in the manufacture of steel in America is becoming more marked. The total output of Bessemer ingots is put down as 3 681,000, which was an increase of 759 000 tons over 1889, and in excess of the output in this country by nearly 2 000,000 tons. Of steel rails, the make last year was 1,876,800 tons, being an increase on the the year of 326,000 tons, and in advance of the make in Great Britain to the extent of the figures following the initial million. The steadily increasing use of Bessemer steel in America for purposes other than the manufacture of rails has frequently been referred to, but this characteristic was more marked last year and the year before than in any previous period. Still, America's production last year was much larger than ever before, totalling, as it did, 513,000 tons, or 138,000 tons more than in 1889. This is the only class of steel in which the United States production is at the present time less than in this country. The crucible steel industry of America, like that of Great Britain and the Continent, is suffering from the invasion of open hearth and Bessemer metal, and last year's make of 71,000 tons was a decrease, compared with the previous year, of 4.700 tons.—[Iron and Steel Trades Journal, London.

Roman Tools and Utensils.

A great deal of interest was excited at the *converzaione* of the Royal Society, in London, on the 6th inst., by an exhibition of 60 tools and utensils of the Roman period, found together in a pit in the Roman-British city of Silchester, Hants, in September, 1890 These included an anvil, a pair of blacksmith's tongs, hammer, axes, gongs, chisels, adzes, and large carpenter's plane, two shoe-making anvils, two plow coulters, a standing lamp, a gridiron, a bronze scale beam, and others. Many of these articles were most remarkably like similar tools of the present day, the plane, which was evidently a "trying plane," and entirely of metal, being very suggestive of a Yankee origin. It is said to be the only Roman plane found in Britain.

Excursions to Forepaugh's Circus at Cleveland and Canton, via Valley Railway.

On Decoration Day, May 30th, the Valley Railway will sell excursion tickets from all stations, to Canton at one fare for the round trip. On June 1st and 2nd will sell excursion tickets to Cleveland at one fare for the round trip from all stations; J. G. Johnson, Gen'l Supt.; J. B Caven, G. P. A.

INDUSTRIAL SUMMARY.

New Enterprises:—

The erection of a foundry and machine shop is contemplated by Lewis Miller at Chester, Pa.

Articles of incorporation have been applied for by the Montreal (P. Q) Metal Co., capitalized at $50,000.

The Reliance Machine Co. is a new organization at Minneapolis, Minn., to manufacture machinery, etc., with a capital stock of $10,000.

The Hallowes Car Axle Box Co., of Jersey City, N. J., has been incorporated to manufacture car axle boxes. The capital stock is $100 000.

The Scott Machine & Hardware Co., at Denver, Col., are enlarging premises to double former size, and will put in several new tools.

The Puget Sound (Wash) Wire, Nail & Steel Co. have organized, with a capital stock of $2 00 000, for the manufacture of nails and wire.

The Springfield Machine Tool Co. has been organized at Springfield, O, to manufacture tools, machinery, etc. The capital stock is $50,000.

The Smith-Courtney Co, Richmond, Va., has been incorporated to manufacture machinery, railroad supplies, etc.; capital stock, $250,000.

The Chicago Down Draft Boiler Co. is a new incorporation at Chicago; capital stock, $50,000; incorporators, F S Moody, W L. Grey and E S Griffing.

The Southwestern Steel Post Co., of East St Louis, has been incorporated with a capital stock of $500 000, by A. B Bennett, H. Pope and W. P. Clarkson.

The Willis Manufacturing Co., at Galesburg, Ill., has been incorporated with a capital stock of $10,000, to manufacture sheet work and galvanized iron cornices.

The American Mining & Milling Machinery Co. has been incorporated at Chicago, with a capital stock of $1,000,000, to manufacture machinery for mining, milling, etc.

The Dunn Corn Harvester & Husker Manufacturing Co., at Beatrice, Neb., capital stock, $50,000, has been incorporated to manufacture the Dunn corn husker and harvester, etc.

The Wallace & Graves Machine and Foundry Co. have filed articles of incorporation at Lafayette, Ind. The capital stock of the company is $20,000, and they will manufacture steam boilers and castings.

W. H. Quick, of New York; E D. Crook, G. A. Horner and others have incorporated the Steam Coil & Pipe Heating Co., at Baltimore, Ind., to manufacture machines for cleansing coils and pipes; capital stock, $250,000.

The Cable Iron Car Roofing Co., of East St. Louis, has been incorporated, with capital stock of $300,000, for the manufacture of car roofing, doors, and other railway appliances; incorporators, Reed Northrup, John C. Wands and G. A. Bannantine.

A recently authorized corporation in Illinois is the Holmes & Pyotts Co., Chicago, to manufacture and use iron and its products for building and machinery purposes; capital stock, $300,000. The incorporators are, Edward B. Holmes, James M. Pyott and David Pyott.

A corporation, to be known as the Malden Machine Co., have been organized at Portland, Me, with a capital stock of $100,000, for the purpose of manufacturing machinery. The officers are, President, F. W. Sawyer, of Malden, Mass; Treasurer, Charles T. Small, of Providence, R. I.

The S. J McCormick Co., of Pittsburgh, Pa., have been granted a charter, with a capital of $50 000. The company proposes to manufacture foundry facings and mill supplies. The directors are Jno. S. McCormick, Frederick S. Hann, of Pittsburgh, and Hawley Treadwell, of New York City.

The Rolled Steel Wheel Co., of Pittsburgh, Pa., propose to erect a manufacturing plant at Kensington, on the Allegheny River, near Parnassus, Pa. The concern have a capital of $600,000, and will manufacture vehicle wheels of all kinds, non-corrosive boiler tubes and stairway and balcony railings. Ground has been broken for the plant, and the work will be rapidly pushed.

Hon Robt. P. Porter, Superintendent of the Census, Col. A. M. Payne an Chas. W. Sanders, were in the West, recently, investigating with a view of establishing an immense industrial plant somewhere on Puget Lound, Wash. The stock companies formed to carry the project are said to have several millions back of them. A large branch of the American Steel Barge Co., of Duluth, Minn, will be one of the industries and a large steel plant another, with others in view.

The Norwich Lock Manufacturing Co., of Norwich, Conn., has contracted with the Roanoke Development Co., to remove its lock factory to Roanoke, Va. The company is to be chartered as the Norwich Lock Manufacturing Co., of Roanoke, Va., with A. C. Denniston, of Philadephia, Pa., as President; E. C. Pechin, Vice-President; and C. H. Beebe, of Norwich, Conn., Secretary; minimum capital stock, $150,000. The main building will be two stories high, 146x200 feet, and the other 250x60 feet. Work will soon commence.

Additions, Enlargements, Removals, etc.:—

The Whittier Machine Co., of Boston, are to have a new shop erected, to be 116x75 feet.

The Muskegon (Mich.) Malleable Iron Works are building a structure 220 x90 feet in size.

A new shop, 115x116 feet, two stories, is to be erected by the Whitin Machine Co., Whitinsville, Mass.

The Industrial Iron Works at Bay City, Mich., are preparing to build an addition 225x90 feet to their works.

The Case Engine Co., of New Britain, Conn., are building an addition 35x 50 feet to their shops, which will soon be equipped and ready for occupancy.

At Orlando, Fla., the South Florida Foundry & Machine Works will soon put in an outfit for the manufacture of tubular boilers, and is now in the market for suitable machinery.

The Etna Iron Co., of Bridgeport, O., intends to enlarge its mill and put in a new battery of boilers. It is also understood that the company intends

putting in new pumping machinery, having a capacity of 500 000 gallons daily.

Plans are being made for the new needle factory of E & J. W. Lathrop, Worcester, Mass. The main building will be 108x125 feet, and will be used for the manufacture of hooks, needles, etc.

The work of removing the machinery of the Underhill Edge Tool Co. from Nashua, N. H., to East Douglas, Mass., commenced this week and quite a number of workmen will follow the removal of the plant.

The Shaw Electric Crane Co., of Muskegon, Mich., have completed plans for a new plant. The works will be extensive and modern in construction, and will be equipped with $40,000 worth of new machinery.

It is stated that the La Fayette Car Works, La Fayette, Ind., have decided to remove the La Fayette branch to Lima, O., where there is already a branch, and that the two works would be united under the name of the Ohio Car Manufacturing Co., and that a department for the manufacture of coaches will be added.

The Chapman Valve Manufacturing Co., of Indian Orchard, Mass., which completed a large addition to their plant only a few weeks ago, are once more talking of enlarging, this time their pattern department being the one considered. It is proposed to build a brick story, 100x40 feet in size, on top of the present pattern building, which extra space would be devoted to this department. The work will probably be done this Summer.

Fires and Accidents:—

The Douglas Foundry, at Chateaugay, N. Y., has been completely wiped out by fire, at a loss of $75,000.

Fire destroyed the F. & P. M. Railroad engine house, at Reed City, Mich. Loss, $5 500; insurance not known.

A fire at Pittsburgh, Pa., destroyed the Rollins' Malleable Iron Works. The loss was $35,000; fully insured. The cause of the fire is unknown.

The extensive bar wire and wire drawing plant of the Joliet Enterprise Co., was destroyed by fire May 18; loss, $25 000; insurance, $65,000. Three hundred men are thrown out of employment by the fire. The company will rebuild.

General Industrial Notes:—

The receivers of the Huntingdon Car Manufacturing Co. having filed their final account with the court, were discharged from further duty. The works will now be operated by the Iron Car Equipment Co., of N. Y. The present company has a very large order for new cars, and it is expected an impetus will be given to the business of the concern.

The Ohio Pulley & Machine Co., of Warren, O., has just put in two special

The Garfield Injector Co., of Wadsworth, O., report business as being very satisfactory, there being an increase in each month during the year over the corresponding months of last year. All old customers are being retained and new ones added daily. This company are manufacturers of injectors exclusively, and give their whole and undivided attention to the manufacturing and selling of these articles.

tools for the manufacture of their patent wood rim-iron arm-split pulley; a turning lathe, 16 feet long with 44-inch swing, and a lock jointer, to cut angle and lock-joint in the wood cants, both at one operation. They have just sent a car load of their pulleys to J. B. Sheriff, Son & Co., Pittsburgh, Pa., and among other recent shipments are a 72x16 to Portland, Me., a 44-inch to Dublin, Tex., and six 80-inch pulleys to Mansfield, O.

To Celebrate.

Take the Nickel Plate, May 29th or 30th, and travel for one fare for the round trip, Decoration Day, returning to and including June 1st, 1891.

Decoration Day Rates

May 29th and 30th, returning to and including June 1st, 1891. Rates between all stations.

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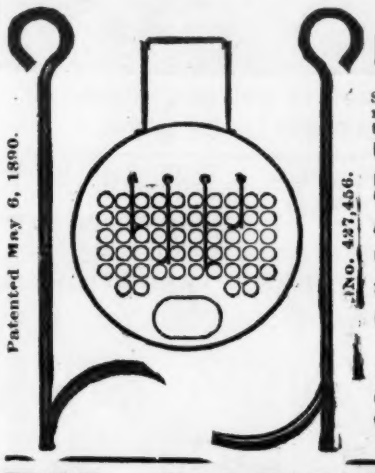
Additional Suburban Trains Between Lorain and Cleveland.

Commencing June 1st, prox., the Nickel Plate will run accommodation trains between Lorain and Cleveland. These will be in addition to those now on the road. The change of time will include a train to leave Lorain about 6:45 A. M., arriving at Cleveland at 8:00 A. M.; a train for Dover leaving Cleveland at 1:30 P. M., arriving there at 2:15 P. M.; returning leave Dover at 3 45 P. M.; arrive in Cleveland 4:30 P. M. Lorain accommodation will leave Cleveland at 5:00 P. M., arrive at Lorain at 6:15 P. M. Train from Buffalo will run about two hours later than at present, leaving Cleveland about 7:15 P. M., arriving in Chicago via Fostoria and B & O R R at 7:00 next morning. No material change is contemplated in the time of other trains. Time tables will be published in a few days.

A Reduction in Price of Tickets

on the Nickel Plate, account Decoration Day, May 29–30.



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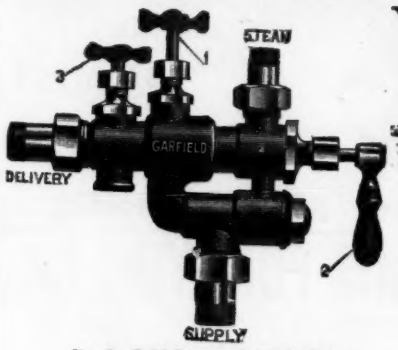

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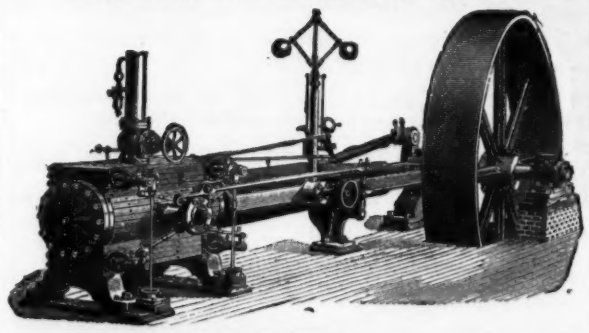

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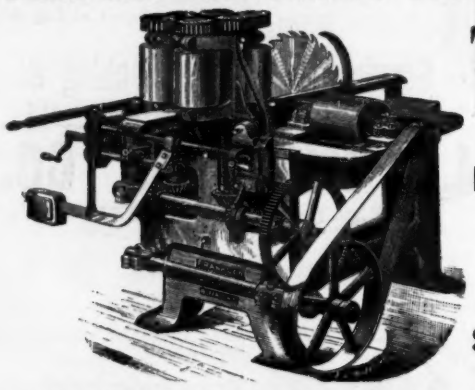

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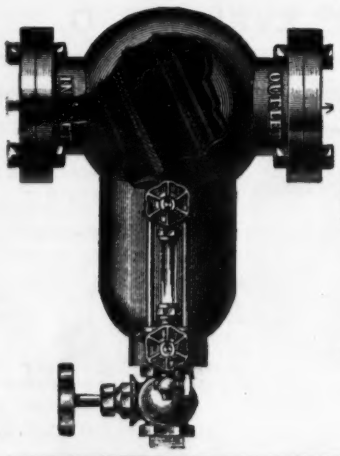

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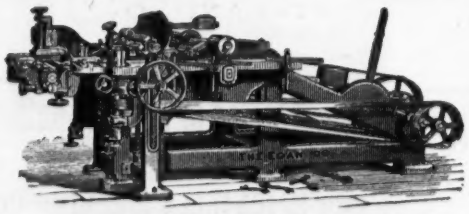

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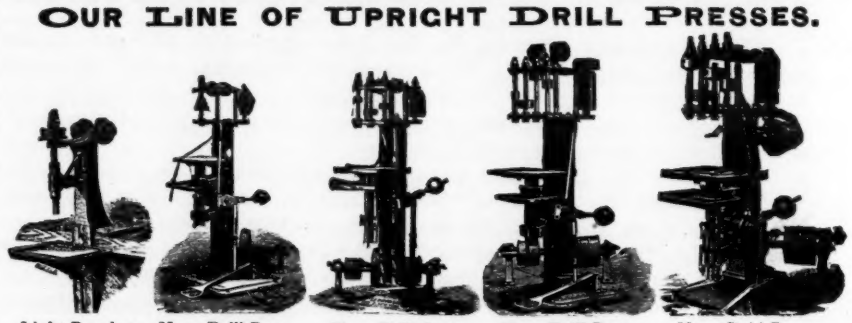

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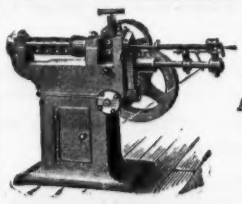

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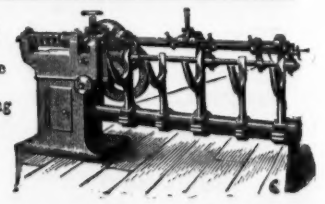

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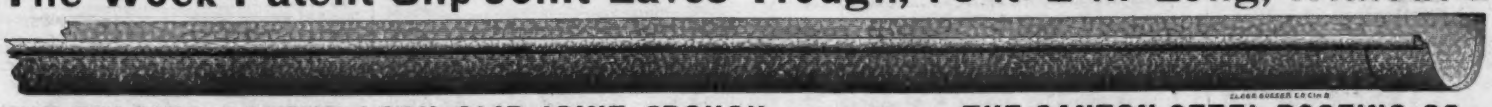

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CLEVELAND (f. o. b. cars, net cash) Bessemer, $17 30; No. 1 Foundry, $16 80; No. 2 Foundry, $15 80; No. 1 Gray Forge, red short, $14 80; No. 2 Gray Forge, neutral, $14 30; No. 1 American Scotch, $16 80; No. 2 American Scotch, $15 80.

CHICAGO (reported by Messrs. Rogers, Brown & Merwin): Southern Coke No. 1. foundry, $16 25@17 00; Southern Coke No. 2 Foundry, $15 50@16 50; Southern Coke No. 3 Foundry, $15 00@16 00; Southern Coke No 1, Softeners, $15 50@16 50; Southern Coke No. 2, Softeners, $14 75@15 50; Ohio Silveries No. 1, $17 75@18 75; Ohio Silveries No. 2, $16 75@ 17 75; Ohio Strong Softeners No. 1, $18 00@19 00; Ohio Strong Softeners No. 2, $17 25@18 25; Lake Superior Charcoal Nos. 1 to 6, $18 00@19 00; Tennessee Charcoal No. 1, $18 00@19 00; Tennessee Charcoal No. 2, $17 50@18 50; Southern Standard Car Wheel, $21 00@23 00; Tennessee Standard Car Wheel, $00 00@00 00.

CINCINNATI (reported by Rogers, Brown & Co.): FOUNDRY IRONS—Southern Coke, No. 1 foundry, $15 00@15 25; Hanging Rock Coke, No. 1 foundry, $16 50@17 50; Jackson Co. Stone Coal, No. 1 foundry, $16 50@17 00; Tennessee Charcoal, No. 1 foundry, $16 50@17 50; Hanging Rock Charcoal, No. 1 foundry, $20 00@22 00. MILL IRONS—Standard Southern Coke, grey forge, $13 00@13 50; Standard Southern Coke, mottled, $12 50@12 75; Cold Short Southern Coke, grey forge, $12 75@13 00; Strong Ohio Neutral Coke, grey forge, $15 00@15 50. CAR WHEEL AND MALLEABLE—Standard Alabama Car Wheel, $20 00@20 50; Tennessee Car Wheel, $18 50@19 50; Lake Superior Car Wheel, $19 50@20 50.

BUFFALO (reported by Rogers, Brown & Co): Mahoning and Shenango Valley strong, No. 1 Foundry, $17 00@00 00; Mahoning and Shenango Valley strong, No 2 Foundry, $16 00@00 00; Ohio Softener No. 1, $17 00@00 00; Ohio softener No. 2, $ 6 00@00 00; Jackson Co., Silvery No 1, $18 25@00 00; Jackson Co. Silvery, No. 2, $17 25@00 00; Lake Superior Charcoal, $18 50@00 00; Tennessee Charcoal, $18 50@00 00; Southern Softener No. 1, $16 25@00 00; Southern Softener No. 2, $15 50@00 00; Southern Strong No. 1 Foundry, $17 00@00 00; Southern Strong No. 2 Foundry, $16 25@00 00· Alabama Car Wheel, $22 00@22 50; Hanging Rock Charcoal, $23 00@24 00.

LOUISVILLE (reported by Hall Bros. & Co.) HOT BLAST FOUNDRY—Southern coke No. 1, $14 25@14 50; Southern coke No. 2, $13 75@14 00; Southern coke No. 3, $13 25@13 50; Mahoning Valley (Lake ore mixtures), $00 00@00 00; Southern charcoal, No. 1, $16 50@17 00; Southern charcoal, No. 2, $16 00@16 50; Missouri charcoal, No. 1, $17 00@17 50; Missouri charcoal, No. 2, $16 50@17 00. FORGE—Neutral coke, $12 50@13 00; Cold short, $12 50@13 00; Mottled, $12 00@12 25. CAR WHEEL AND MALLEABLE—Southern (standard brands), $19 50@2 50; Southern (other brands), $17 50@18 00; Lake Superior, $20 50@21 50.

ST. LOUIS (reported by Rogers, Brown & Meacham): HOT BLAST COKE AND CHARCOAL—Southern Coke No. 1, $15 50@15 75; Southern Coke No. 2, $14 75@15 00; Southern Coke No. 2, $ 4 00@14 25; Southern Grey Forge, $13 50@13 75; Southern Charcoal No. 1, $17 75@18 00; Southern Charcoal No. 2, $17 25@17 50; Missouri Charcoal No. 1, $15 50@16 00; Missouri Charcoal No. 2, $15 00@15 50; Ohio Softeners, $18 00@19 50. CAR WHEEL AND MALLEABLE IRONS—Lake Superior, $20 00@20 50; Southern, $19 00@21 00. CONNELLSVILLE COKE—East St. Louis, $0 00; St. Louis, $0 00.

DETROIT (reported by William F. Jarvis & Co.): Lake Superior Charcoal, all Numbers, $18 00@18 50; Lake Superior (coke) Bessemer, $18 00@18 50; Katahdin (Maine charcoal), $23 50@24 00; Lake Superior Coke, Foundry, all ore, $18 00@18 50; Lake Superior Coke, Foundry, all ore, $00 00@00 00; Standard Ohio Black Band, $18 00@18 50; Southern No. 1, $ 6 25@16 50; Southern Gray Forge, $14 00@14 50; Jackson County (Ohio) Silvery, $18 25@18 75; Old Car Wheel, $00 00@00 00. Connellsville Coke, $0.00.

LOUISVILLE (reported by Geo. H. Hull & Co.): Southern Coke No. 1 Foundry $14 50@15 00; Southern Coke No. 2 Foundry $13 75@14 25; Southern Coke No. 3 Foundry $13 25@13 75; Grey Forge, $12 75@13 25; Southern Coke Silver Grey, $00 00@00 00; Southern Charcoal No. 1 Foundry, $16 00@17 00; Car Wheel, $17 00@20 00.

PITTSBURGH (reported by A. H. Childs): No. 1 Foundry, $16 25@16 50; No. 2 Foundry, $15 25@15 50; Grey Forge, $14 25@14 50; White and Mottled, $13 25@13 50; Warm Blast Charcoal, $18 00@20 00; Cold Blast Charcoal, $22 00@27 00; Bessemer, $16 00@16 25.

MERCHANT IRON AND STEEL.

Flat Bar

1½ to 4 by ⅛ to 1 inch	1 80
4½ to 6 by ⅛ to 1 inch	1 90
1½ to 6 by 1⅛ to 2 inch	2 20
1¼ & 1¾ by ⅛ to ¼ inch	1 90
1 & 1¼ by ⅛ to ¼ inch	2 00
⅛, ¼ and ⅜ by ⅛ to ¼ inch	2 20

Round and Square.

1 to 1⅜ inch	1 80
1 to 2¼ inch	2 00
2¼ to 3¼ inch	2 10
3¼ to 4 inch	2 80
4¼ to 4½ inch	3 30
4¾ to 5 inch	3 50

Oval.

⅜ to 1¼ inch	2 20
⅜ to ¾ inch	2 40
⅞	2 60
⅜	3 00

Half Oval and Half Round.

1¼ to 3 inch	2 90
⅜ to 1¼ inch	2 50
⅜ to ¾ inch	3 10
⅛	3 30
⅜	4 80

Heavy Band.

¼ to 6 by ¼ and 5-16 inch	2 00
¼ to 1¾ by ¼ and 5-16 inch	2 10
¼ to ⅜ by ¼ and 5-16 inch	2 30
⅜ to ⅝ by ¼ and 5-16 inch	3 80

Hoops.

1¼ to 4, Nos. 13 to 15	2 60
1¼ to 2, Nos. 16 to 18	2 70
1¼ to 2, No. 19	2 80
1¼ to 2, No. 20	2 90
1¼ to 2, No. 21	3 00
1¼ to 2, No. 22	3 10
15-16, 1 and 1¼, Nos. 13 to 15	2 80
15-16, 1 and 1¼, Nos. 16 to 18	2 90
15-16, 1 and 1¼, Nos. 19 and 20	3 00
15-16, 1 and 1¼, No. 21	3 10
15-16, 1 and 1¼, No. 22	3 20
⅞, Nos. 13 to 15	3 00
⅞, Nos. 16 to 18	3 10
⅞, Nos. 19 and 20	3 20
⅞, No. 21	3 30
⅞, No. 22	3 40
13-16, Nos. 13 to 15	3 20
13-16, Nos. 16 to 18	3 30
13-16, Nos. 19 and 20	3 40
13-16, No. 21	3 50
13-16, No. 22	3 60
¾, Nos. 13 to 15	3 30
¾, Nos. 16 to 18	3 50
¾, Nos. 19 and 20	3 60
¾, No. 21	3 70
¾, No. 22	3 80
11-16, Nos. 13 to 15	3 50
11-16, Nos. 16 to 18	3 70
11-16, Nos. 19 and 20	3 80
11-16, No. 21	3 90
11-16, No. 22	4 00
⅝, Nos. 13 to 15	3 80
⅝, Nos. 16 to 18	4 00
⅝, Nos. 19 and 20	4 10
⅝, No. 21	4 20
⅝, No. 22	4 30
⅝, No. 23	4 50

Light Band.

1¾ to 6 by ⅛ to 3-16 in	2 20
1¾ to 6 by Nos. 11 and 12	2 30
1 to 1¾ by ⅛ to 3-16 in	2 40
1 to 1¾ by Nos. 11 and 12	2 50
⅞ and 13-16 by ⅛ to 3-16 in	2 70
⅞ and 1 3-16 by Nos. 11 and 12	2 80
¾ and 11-16 by ⅛ to 3-16 in	3 00
¾ and 11-16 by Nos. 11 and 12	3 10
⅝ and 9-16 by ⅛ to 3-16 in	3 30
⅝ and 9-16 by Nos. 11 and 12	3 40
½ by ⅛ to 3-16 in	3 60
½ by Nos. 11 and 12	3 70

Wagon Box Iron.

⅜ inch, beveled edge, by Nos. 11 and 12	2 80
⅜ inch, " " " 13 and 14	3 00
½ inch, " " " 11 and 12	3 10
½ inch, " " " 13 and 14	3 30

Sheet Iron:

No. 10 to 14	2 65
No. 15 to 17	2 75
No. 18 to 21	2 99
No. 22 to 24	3 15
No. 25 to 26	3 30
No. 27	3 40
No. 28	3 50

Iron Boiler Plates.

Tank, ¼ inch and heavier	2 60
C No. 1, " "	2 85
C H No. 1 " "	3 10
C H Flange, " "	3 85
Extra Flange, "	4 35
Solid Fire Box "	5 10

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 75
Shell	3 15
Flange	3 45
Marine Flange	3 85
Fire Box	4 55

Above includes plates 90 inches wide.

90 to 96 in. wide	¼c lb extra
96 to 100 in. wide	1c "
100 to 104 in. wide	1¼c "
104 to 116 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs
1 to 2 in. inclusive	09
9-16 to ⅞ in "	09
7-16 to ⅝ and 2¾ to 3 in	10¼
3¼ to 4 in	11
⅜ to 11-16 and 4¼	10¼
⅞ to 6 in	11½
¼ to 9-32 and 6⅛ to 7 in	13
3-6 in	14

Flats.

	cts. lbs
2 to 9-16 wide by 2 to ⅝ thick	9

Bessemer and O. H. Steel.

Machinery	base price, 2 75
Tire	" 2 75
Spring	" 3 25
Sleigh Shoe	" 2 75
Toe Calk	" 3 00
Cutter Shoes, tapered and burr,	" 3 00

English Tool Steel.

Jessop's	16c
Hobson's "Best"	16c
" "Choice"	16c

Burden Boiler Rivets.

⅜, ½, 11-16 and ⅝ inches diameter	4 00
Bridge ⅜, ½, 11-16 and ⅝ inch diam	4 00

SCRAP IRON AND OLD METAL.

NET TONS	
No. 1 R. R. wrought scrap	$19 00
No. 1 wrought scrap	17 00
No. 1 Machine cast scrap	12 00
Iron axles	24 00
Axle turnings	13 50
Wrought turning (free from cast)	12 00
Cast borings	8 00
Uncut wrought iron boilers	11 00
Steel boiler plates	17 00
Grate Bars	8 00
Pipes and flues (Clean)	13 50
Tank iron	13 50
Hoop and band iron	10 00
Sheet iron	9 50
Wrought drillings	11 00
Malleable iron	10 00

Reported by Messrs. BLACK & POLLOCK, Cincinnati, O.:

Railroad Wrought	$20 00
No. 1 Country Wrought	17 00
Stove Plate	8 75
Machine Castings	11 00
Hoop and Sheet	8 00
Casting Borings	9 00
Wrought Turnings	12 00

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BESSEMER STEEL RAILS,

Blooms and Billets, Steel Angles, Forgings, Bar and Spring Steel. Steel Street Rails, Steel Oil Barrel Hoops, Wire of all Kinds, Iron and Steel Boiler Plates, Galvanized and Black Sheet Iron, Corrugated Iron Roofing, Sheet Steel.

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MANUFACTURERS OF

SHEET IRON AND SHEET STEEL

Squared Roofing Sheets a Specialty.

CAMBRIDGE REFINED IRON. TRADE MARK

CAPACITY RANGES FROM No. 30 26 INCHES WIDE TO 1-4×40×120.

CAMBRIDGE SOFT STEEL. TRADE MARK

CORRESPONDENCE SOLICITED

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Ball-Norton (Monarch) Electro Magnetic Separator.

Phosphorus, sulphur, silica, hornblende and other impurities eliminated from Iron Ore, and non-Bessemer ore converted into Bessemer Ore. Samples treated without charge. Correspondence solicited.

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Rooms 716, 717, 718, 719 Perry-Payne Bld'g.

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Successors to Tuttle, Oglebay & Co.,

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FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS,

CLEVELAND, OHIO.

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J. H. OUTHWAITE & CO.,

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LAKE SUPERIOR AND MENOMINEE RANGE

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AND METALS.

Cleveland, - Ohio.

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Dealers in Iron Ores

from their own mines near Marquette, Lake Superior.

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MINERS AND SHIPPERS OF

Ohio Steam Coal and Coke.

Mines on the Cleveland, Lorain & Wheeling R. R. Capacity, 3,000 tons daily.

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JAS. PATTERSON, Sales Agent.

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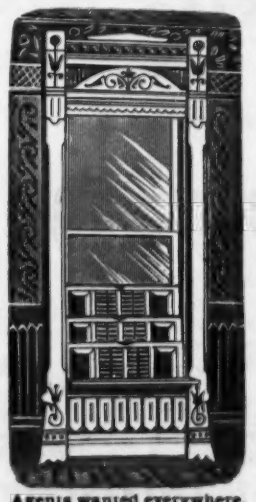
Saws, Tools and Machinery.

Office and Warerooms, 28 Columbus st. Factories on Columbus, Winter and Leonard streets.

Cleveland, O., U. S. A.

Hartman's Patent Inside Sliding Window Blind



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MACHINERY SUPPLY MARKET.

Anvils.

American.....₩ lb 9@12
Wrights.....₩ lb 12

Bellows.

Blacksmiths' { Hill's.....dis 40
Bullock's.....dis 50&10
Moulders'.....dis 40@40&10
Hand.....dis 40&10@50

Belting.

Boston Belting Co's standard.....dis 70
" " " extra.....dis 60&5
" " " best.....dis 55
Hoyt's Short Lap.....dis 45
Cleveland Rubber Co. extra standard..dis 60&10
Shults Raw Hide Leather Belting, single.....dis 40
Shults Raw Hide Leather Belting, double, and Light Double.....dis 40
Standard, oak tanned.....dis 50&10
Alexander Brothers' pure oak tanned.....dis 45

Blowers and Exhausters.

B. F. Sturtevant's.....dis 20
Boston Blower Co.....dis 35
Buffalo.....dis 35

Borax.

.....₩ lb 12

Chalk.

White.....₩ gross 50
White Crayon.....₩ gross 12@12½ dis 10
Red.....dis 70
Blue.....dis 85

Chucks.

Cushman's 4 Jaw Independent.....dis 45
" Combination.....dis 40
" Geared Scroll.....dis 30
" 2 Jaw Brass Workers.....dis 30
" Drill.....dis 35
Wescott's Scroll Combination.....dis 33⅓
" Independent.....dis 40
" Little Giant Drill.....dis 30
Horton's Universal.....dis 40
" Independent.....dis 45
Whiton's Independent.....dis 45
National Combination.....dis 40
Sweetland " .....dis 40
Almond Drill.....dis 20
Morse " .....dis 15
Skinner's Combination Lathe.....dis 33⅓
" Independent Lathe.....dis 40
" Universal Lathe.....dis 40
" Drill.....dis 15

Cutters and Reamers.

Cleveland.....dis 10@15
Pratt & Whitney.....dis 10@15
Standard.....dis 10@15
Brown & Sharpe, Milling Cutters.....dis 15
" Gear Cutters.....dis 15

Crowbars.

Cast Steel.....₩ lb 4
Iron, steel points.....₩ lb 3½

Drill and Drill Sockets.

Twist drills.....dis 50&10
Morse Taper and Straight shank to 1½".....dis 50&10
Morse Taper and Straight shank Larger than 1½".....dis 25
Drill Sockets.....dis 25
Standard Twist Drills.....dis 55@55&5
Cleveland " " .....dis 55@55&5

Emery.

	No. 4 to 46 gr.	No. 54 to 150. gr.	Flour, F.	C. F. FF.
Kegs, ₩ lb	4 c	5 c		2¾c
½ kegs ₩ lb	4¼c	5¼c		2¾c
¼ kegs ₩ lb	4½c	5½c		3 c
10 lb cans, 10 in case	6 c	6½c		5 c
10 lb cans, less than 10	10 c	10 c		7½c

Emery Cloth and Paper.

Barder, Adamson & Co.....dis 45@50
H. H. Barton.....dis 50@50&10

Emery Wheels.

Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 10&10

Files.

Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
Arcade.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
ndustry File Works, hand cut.....dis 50

Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs. 18c over 5 lbs 14c, new list.

Jack Screws.

Illinois Bolt Co. list.....dis 70

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3½	2½
Hexagon	15½	11½	8½	6	5½	5½	5
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₩ lb add ½c., 1lb boxes add 1c to list.

Nails (wire.

List July 14, 1887.....dis 70 &10
Standard Penny Nails, ₩ keg card rate { Car lots.....$2.30 { Less than car lots $2.40

Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 10@11
Russia Packing " .....₩ lb 14
Italian Packing " .....₩ lb 13@14
Plumbago Piston.....₩ lb 40
Morrison's " .....₩ lb 50
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 48

Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

Pulleys.

Iron Pulleys, Walker List.....dis 45
Medart Pulleys.....dis 55
Split Wood Pulleys.....dis 50@55

Rivets.

Iron, Thousand, list November 17, ...dis 50
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50
Copper.....dis 50@50&10

Rope.

Manilla, ¼ inch and over.....₩ lb 13¼
Sisal, ¼ inch and over.....₩ lb 12¼

Sand Paper.

B. A. & Co.....dis 45@50
H. H. Barton's.....dis 40@45
New England Flint.....dis 40@50
Barton's Garnet.....dis 20

Saws.

Disston's Circular.....dis 40@10
" Band.....dis 10
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Disston's.....dis 30
Atkins' Cicular Saws.....dis 40&45
" Mill, Mulay and Drag Saws..dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....dis 70c per ft
" Dexter Cross-cuts.....dis 50c "
" Diamond " .....dis 30c "
" Tuttle Tooth Cross-cuts..dis 25c "
" One-man Cross-cuts.....dis 33c "
No. 1 Handles.....dis 25c per pair
No. 6 " .....dis 16c "
Excelsior Saw Tools.....$6 per doz
Perfection " .....$15 "
Detroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

Screws.

Wood Screws—New List 1890.

Flat head iron.....dis 72½
Round head iron.....dis 67½
Flat head brass.....dis 72½
Round head brass.....dis 65
Square Cap.....dis 65
Hexagon Cap.....dis 60
Set C. H. C. P.....dis 70
Machine, flat head, iron.....dis 65
Machine, round head, iron.....dis 60
Bench and hand—
Lag or coach.....dis 75@75&10
Coach, patent gimlet point.....dis 75

Shovels and Spades.

Ames' list November 1, 1885.....dis 20
Dennis.....dis 5.25
Hussey & Binns, railroad.....dis 8.00

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 50
Pulley Taps.....dis 40

Twine.

	BC.	B.
No. 12, Flax Twine, ¼ and ⅜ lb Balls	21c@29c	
No. 18 " " ¼ and ⅜ "	18c@28c	
No. 36 " " ¼ and ⅜ "	16c@27c	
2-Ply Hemp, ¼ & ⅜ lb Balls (Spring Twine	11½c	
3-Ply " 1 lb Balls	12@12½c	
3-Ply " 1½ lb Balls	11@11½c	
Cotton Wrapping, 5 Balls to lb	15@16c	

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

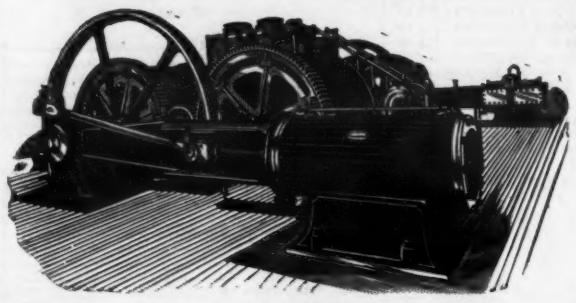
New List, Jan. 18, 1884

Brass and copper.....dis 20@25
Bright and annealed, Nos. 0@18...dis 70&10@75
" " Nos. 19@26..dis 75@75& 5
" " Nos. 27@36..dis 75&10& 5
Coppered Nos. 0 to 18, market list..dis 70@70& 5
Galvanized Nos. 0 to 18 " "..... dis 65&5
Tinned market Nos. 0 to 18..... dis 67½
Cast steel.....dis 30
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....$6.00@lb dis 3

Wrenches.

Coe's genuine.....dis 50
Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanics'.....dis 55&10,& 3
Bemis & Call's Combination.....dis 25
Donohue's Engineers.....dis 20&10
Lamson & Sessions Engineers.....dis 60
Billings & Spencer's Drop Forged.....dis 25
William's " " .....dis 25
Alligator " " .....dis 50

Webster, Camp & Lane Machine Co.



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Mining Machinery,

Improved Band Friction Hoisting Machinery, Geared or Direct Acting, for round or flat rope.

Wire Rope Haulage Machinery,

Endless or Tail Rope Systems.)

CORNISH PLUNGER AND BUCKET LIFT PUMPS.

Automatic or Slide Valve Steam Engines, Sheaves, Cages, Buckets, Etc.

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ESTABLISHED 1828.

Oldest and Largest Manufacturers In the world.

VULCANIZED RUBBER GOODS

For Mechanical purposes.

256-260 DEVONSHIRE STREET, BOSTON.

100 Chambers St., New York.
161 to 165 W. Pearl St., Cincinnati, Ohio.
148 to 150 Water St., Cleveland, Ohio
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THE THOS. D. WEST FOUNDRY. CO.

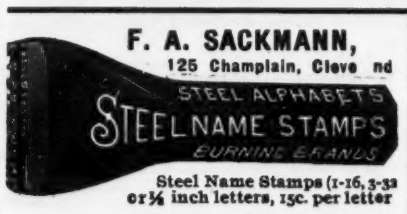
CLEVELAND. O.

LIGHT AND HEAVY

IRON CASTINGS.

DAILY MELTING CAPACITY 75 TONS—SPECIAL FACILITIES FOR ECONOMICALY TURNING OUT SMOOTH CLEAN CASTINGS.

DUPLICATE WORK A SPECIALTY



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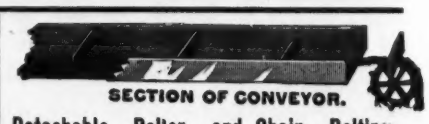

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Detachable Roller and Chain Belting,

CHAIN.

MADE IN ALL SIZES OF

Malleable Iron and Steel,

DESIGNED FOR

Elevators, Conveyors, Drive Belts, etc.

For handling materials of all kinds.

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Eastlake Metallic Shingles.

Unequaled for

ROOFING AND SIDING.

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W. J. BURTON & CO.'s

Galvanized Iron Cornice Works,

Detroit, Mich.

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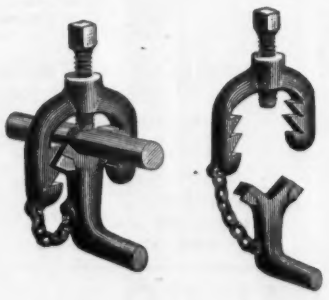
THE INDISPENSABLE LATHE DOG.



THE INDISPENSABLE LATHE DOGS can be attached to work after the work is centered in the lathe. They can be used equally as well BETWEEN COLLARS as upon plain or straight work.

DROP FORGED FROM BAR STEEL.

No. 1 takes from ¼ to 1¼ inches, price, each.....$1 50
" 2 " ½ to 2¼ " " 2 50
" 3 " 1 to 3¼ " " 3 50

Price, per set of three, to take from ¼ to 3¼ in. 7 50

PALMER, CUNNINGHAM & CO., L't'd,

607 Market St., PHILADELPHIA, PA.

IRON FOUNDRY

CANTON IRON FOUNDRY CO.,

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Common augers and bits.....dis 70
Snell's.....dis 60&5
Cook's Douglass Mfg. Co.....dis 55
Russell Jennings' augers and bits.....dis 25
Expansive Bits, Clark's small, $18; large, $26.....dis 35@35&5
Hollow Augers, Ives'.....dis 25&10
Hollow Augers, Bonney's Adjust. ₩ doz., $48.....dis 40&10
Hollow Augers, Stearns' Adjust. ₩ doz., $48.....dis 20&10
Gimlet bits, common.....per gross $3 25@4 00
Standard Bit Stock Drills.....dis 50&10&5
Ship Augers.....dis 15&10@15&10&5

Axes.

Makers' and Special Brands—
First quality.....₩ doz $7 00
Others.....₩ doz $6 00
Full polished.....₩ doz $8 00

Bolts.

Cast iron barrel bolts.....dis 70
Cast iron shutter bolts, etc.....dis 70
Cast iron chain bolts.....dis 65&10
Ives' patent door bolt.....dis 60
Wrought iron barrel bolts.....dis 70
Wrought iron square bolts.....dis 70
Wrought shutter bolts.....dis 60&10
Sargent's list
Carriage, common, new list.....dis 75&10
Tire, common, new list.....dis 65
Carriage and tire, Philadelphia pattern.....dis 75&10
Stove bolts.....dis 60
Plow bolts.....dis 60&5
Machine.....dis 75&10@80
Ends.....dis 75&10&80

Buckets, Elevator.

.....dis 50&10

Butts.

Wrought brass.....dis 75&10
Cast brass, loose joint.....dis 33⅓
Cast Iron—
Fast joint, narrow.....dis 50&10&5@60
Fast joint, broad.....dis 50&10@60
Loose joint.....dis 70&10
Loose joint, jap.....dis 70&10
Loose joint, jap. with acorns.....dis 70&10
Loose pin, acorns.....dis 70&10
Loose pin, japanned acorns.....dis 70&10
Loose pin, acorns, jap. plated tips.....dis 70&10
Wrought steel—
Wrought, fast joint, narrow.....dis 70&10
Wrought, fast joint, broad.....dis 70&10
Wrought, loose joint, broad.....dis 70&10
Table Butts, back flaps, etc.....dis 70&10
Regular inside blind.....dis 70&10
Light inside blind.....dis 70&10
Loose pin.....dis 70&10
Light loose pin.....dis 70&10

Carbonized Felt and Building Papers.

(POWERVILLE BRAND.)

	Per roll of 500 sq. feet.
Eberts Bros., Detroit.	
No. 1—Slaters'.....	$1.25
"A," Stringed Roofing, Light.....	1.50
"B," Stringed Roofing, Medium.....	1.75
"C," Stringed Roofing, Heavy.....	2.00
Stringed, Rosin-Sized.....	1.00

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Asphaltum, Trinidad Refined, ₩ ton.....$30.00
Asphaltum, Fine Grade, ₩ ℔.....08
Coal Tar Felt, 1 Ply, ₩ ℔.....02
Coal Tar Felt, 2 Ply, ₩ roll 108 sq ft.....1.42½
Coal Tar Felt, 3 Ply, ₩ roll 108 sq ft.....1.85
Roofing Pitch, ₩ gal.....09

Chains.

Revised List.
Trace, 6½-10-2.....₩ pair 1.85
Trace, 6½-10-3.....₩ pair .92 } .....50&10
Trace, 7-10-2.....₩ pair 1.11
German Halter Chain, list June, 1887...dis 50&10
German Coil, list of June, 1887.....dis 50&10@60
Galvanized Pump Chain.....₩ ℔5½@6
Jack Chain, Iron.....dis 75&10
Jack Chain, Brass.....dis 75

Chisels.

Socket Framing and Firmer.....dis 75
Socket Framing and Firmer, Buck Bros..dis 50
Socket Firmer and Framing, L. & I. J. White.....dis 50@50&5
Tanged Firmers.....dis 40&10

Cutlery.

Table.....net
Excelsior Pocket.....net

Fibre Ware—Standard.

	Nos. 1	5.	5X.
Pails, water, 12 qt.....	$4 00	$4 50	$.....
Dairy, 14 qt.....	4 50	5 00	.....
Fire 12 qt.....	5 00	.....	.....
Sugar.....	6 00	6 50	.....
Horse.....	.....	5 00	.....
Buggy.....	4 00	.....	.....
Chamber, Slop, Commode } 5 and 5X 14 qt.....	6 50	7 50	8 50
ars, slop, 5 and 5X 14 qt.....	8 00	9 00	10 00
Basins, wash—			
10½ inch.....	2 00	2 25	.....
12 inch.....	2 25	2 75	3 25
13½ inch.....	2 75	3 25	3 75
15 inch.....	3 25	3 75	4 25
Bowls, fruit.....	.....	2 50	.....
Servers, 12 in.....	.....	2 25	.....
Baskets, waste paper, 13 in.....	.....	6 00	.....
Spittons, "Daisy," pressed 8 inch.....	4 00	4 50	5 00
10 and 11½ inch.....	6 00	6 50	7 50

No. 1 plain; No. 5 decorated; No. 5X White decorated.

Gimlets.

Nail and Spike.....dis 50&10&5
Double cut, low list.....dis 25
"Bee".....₩ gross $12, dis 25@25&5

Hanger

Barn door, old patterns.....dis 60&10&10@70
Climax, (Anti-Friction).....dis 55
Scranton.....dis 33⅓
Kidder's.....dis 50&10@60
Terry's Patent.....5 in., $12; 4 in., $10, dis 50&5
Paragon.....dis 40&10
Richard's.....dis 30@30&10

Horse Nails.

No.	10	9	8	7	6	
Ausable, ₩ M.	23	24	25	26	28	dis 40
Putnam, ₩ M.	18	19	20	21	23	dis 15
Essex						dis 25&10

Horse Shoes.

Burden, at factory.....₩ keg $4 00
R. I. Horshoe Co., Perkins' Imp. at factory.....₩ keg $4 00
Mule Shoes, at factory.....₩ keg $5 00

Knobs.

Carriage, japanned.....₩ gross 80c dis 60&10
Base, rubber tip.....dis 70&10&5
Hematite door knobs, new list.....dis 40&10@50
Door mineral.....dis 65c@68c
Door Por. japanned.....dis 75c@78c
Door Por. nickle.....$2 00@2 25
Door Por. plated.....$2 00@2 25

Locks, Bolts, Etc.

P. & F. Corbin, Locks and Bronze Goods.
Door locks, knobs and latches.....dis 60&10
Escutcheons and keys.....dis 60&10
Padlocks and padlock keys.....dis 75
Bell pulls, mineral, porcelain and jet dis 60&10
Bell pulls, genuine bronze.....dis 60&10
Lever bell pulls, genuine bronze.....dis 60&10
Butts', genuine bronze.....dis 60&10
Butts' bronze plated.....dis 60&10
Store door locks and latches.....dis 60&10
Store door handles.....dis 60&10
Shutter hinges&flaps, genuine bronze.dis 60&10
Shutter hinges, bronze plated.....dis 70
Flush bolts, genuine bronze.....dis 70
Shutter knobs, genuine bronze.....dis 50
Shutter bars, genuine bronze.....dis 60
Sash lifts, genuine bronze.....dis 60
Sash pulls and plates, genuine bronze.....dis 60
Push plates, genuine bronze.....dis 60
Drawer pull, genuine bronze.....dis 70
Letter box plates, genuine bronze....dis 60&10
Barn door locks.....dis 33⅓
Bishop's Buckeye Sash Locks.....₩ gross $4.80

Plumbs and Leve s.

Standard list.....dis 70&10
Pocket levels.....dis 70&10
Davis' inclinometers.....dis 10&10

Pumps.

Cistern, best makers.....dis 50&10@60
Pitcher spout, best makers dis 60&10@60&10&10
Pitcher spout, cheaper goods.....dis 70@70&5

Pokes, Animal.

Bishop's I. X. L.....₩ doz $6 00
Bishop's O K.....₩ doz $5 25
Bishop's Pioneer.....₩ doz $3 75
Bishop's American.....₩ doz $2 75

Rakes.

Cast steel.....dis 70
Malleable.....dis 70@70&5

Razors.

J. R. Torrey Razor Co.....dis 20
Wostenholme & Butcher.....$10@$...dis 10
Rifle razor.....dis $9 50 net

Rat Killers.

Schuyler's.....₩ gross $15 00

Scales.

Hatch, Counter, No. 171.....₩ doz $21 00
Hatch, Tea, No. 161.....₩ doz $5 75@7 00
Chatillon's Grocers.....dis 50
Family Turnbulls.....dis 30@30&10
Scale Beams, List of January 12, 1882.....dis 50&10@50&10&4

Screw Drivers.

Stanley R. & L. Co.'s Varnished Handles.....dis 65&10
Stanley R. & L. Co.'s Black Handles..dis 60&10
Sets interchangeables.....₩ doz $18 dis 25

Squares.

Steel and iron, Nickel plated.....dis 75&10@80
Disston's try square and T bevels.....dis 45&10
Winterbottom's try and miter.....dis 30&10

Tacks, Brads, Etc.

New List, Oct. 19, 1890.
American iron carpet tacks all kinds dis 77½&10
Steel carpet tacks all kinds.....dis 75&10
Swedes iron carpet tacks, all kinds dis 75&10
Swedes iron tacks.....dis 75&10
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Tinned Swedes iron tacks.....dis 77½&10
Tinned Swedes iron Upholsterers' tacks.....dis 77½&10
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Copper tacks.....dis 40&10
Copper finishing and trunk nails.....dis 50&10
Cigar box nails.....dis 50&10
Finishing nails.....dis 60&10
Hungarian nails and miners' tacks...dis 60&10
Gimp and lace tacks.....dis 77½&10
" " " tinned.....dis 60&10
Trunk and clout nails.....dis 72½&10
Tinned trunk&clout nails.....dis 66&10
Basket nails.....dis 66&10
Chair nails.....dis 66&10
Common and patent brads.....dis 66&10

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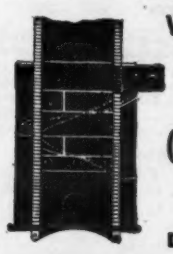

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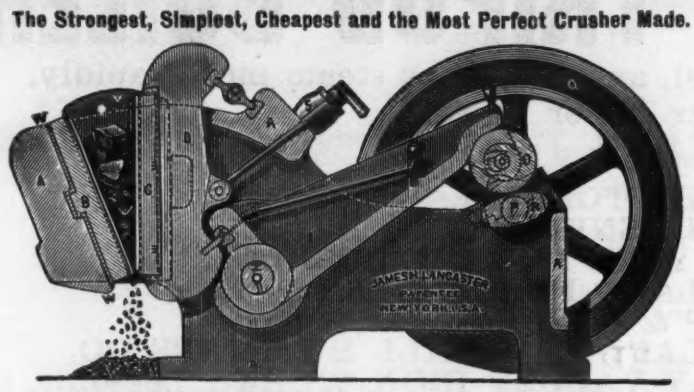

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Standard Time.

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Depot, South Water Street and Viaduct.

	Arrive.	Depart.
N. Y. & Pitts. Express.....	†5 38 a m	*8 25 a m
Fast N. Y. & Pitts. Express*	10 55 a m	*3 00 p m
Mahoning Accommo.....		†6 40 a m
Pittsburgh Express.....	†6 25 p m	
Youngstown Local.....	†8 05 a m	
Mahon'g div. & Pitts Local		*11 40 a m
Mahoning Val. Accom.....		†4 30 p m
Pittsburgh Express.....	†1 20 p m	11 10 p m
New York Express.....	*8 00 p m	.....

*Daily. †Daily, except Sunday. ‡Daily except Monday.

Cleveland & Canton Railroad.
(Standard Gauge.)

Depart for—
Zanesville and Coshocton—6:50 a. m., 3:00 p. m.
Canton—6:50 a. m., 3:00 p. m., 6:20 p. m.
Kent—6:50 a. m., 3:00 p. m., *5:45 p. m. 6:20 p. m.
Bedford—6:50 a. m., 11:10 a. m., 1:30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m. 10:35 p. m.
Newburgh—6:15 a. m., 6:50 a. m., 11:10 a. m., 1.30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m., 10:35 p. m.
Arrive from—
Zanesville and Coshocton—10:30 a. m.,6:30 p m.
Canton, 10:30 a. m., 2:35 p. m., 6:30 p. m.
Kent—*8:10 a. m., 10:30 a. m., 2:35 p. m., 6:30 p.m.
Bedford—6:00 a. m., *8:10 a.m., 10:30 a.m., 1:05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p.m., 7:10 p.m.
Newburgh—6:00 a. m., 7:15 a. m., *8:10 a. m., 10:30 a. m., 1.05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p. m., 7:10 p. m.
Trains marked * run daily.

Valley Railway.

FOR AKRON, CANTON AND MARIETTA.
Depot oot South Water Street.

	Depart.	Arrive.
Valley Junction Mail.....	*7 25 a m	*6 40 p m
Marietta Express.....	†11 15 a m	†2 35 p m
Balto. & Wash. Express....	*4 00 p m	*10 25 a m
Cleve. and Canton Express	†6 30 p m	†8 15 a m

*Daily. †Daily, except Sunday.

J. T. JOHNSON, Gen. Supt. J. B. CAVEN, Gen. Pass. Agt.

From Cleveland Union Station.

PENNSYLVANIA LINES.

Cleveland & Pittsburgh R. R.

	Depart.	Arrive.
For Pittsburgh, Baltimore, Washington, Philadelphia and New York.	7 45 a m	d5 25 a m
	1 15 p m	12 50 p m
	d11 10 p m	6 35 p m
Wheeling and Bellaire.	7 45 a m	12 50 p m
	1 15 p m	6 35 p m
	*11 10 p m	.....
Alliance Accom.....	3 35 p m	10 10 a m
Ravenna Accom.....	5 00 p m	8 25 a m

d Daily. * Except Saturday. Other trains except Sunday.

From Cleveland Union Station.

Mt Vernon and Pan Handle Route

Cleveland & Pittsburgh R. R.

	Depart.	Arrive.
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon, Columbus, Xenia, Dayton, Cincinnati, Louisville, Indianapolis, St. Louis, and all points in the South and Southwest.	8 00 a m	d 7 00 am
	d 8 00 p m	5 40 p m
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon and Columbus.	1 15 p m	12 50 p m
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No. 70, Pittsburgh Accom.....	*11 25 a m
No. 64, New York & Pitts. Limited...	* 2 50 p m
No. 66, Mantua Accommo.....	* 4 20 p m
No. 74, Youngst'n Ex.....	† 6 00 p m
No. 68, New York & Pitts. Ex.....	*11 00 p m
	Arrive.
No. 61, N. Y. & Pittsburgh Express...	† 5 15 a m
No. 71, Youngstown Accom.....	* 7 15 a m
No. 65, New York & Pitts. Lim.....	* 9 55 a m
No. 67, Pittsburgh Accom.....	*12 45 p m
No. 73, Leavittsburgh Local.....	* 2 10 p m
No. 63, New York & Pitts. Ex.....	* 6 50 p m
No, 75, Mantua Accom.....	* 7 20 p m
No. 69, Youngstown Express.....	† 9 10 p m

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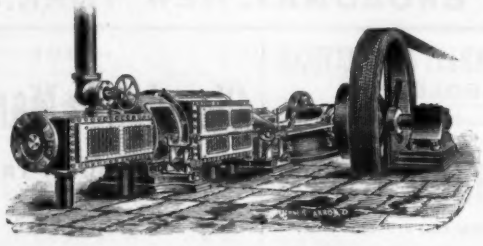

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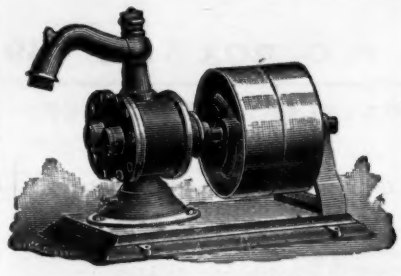

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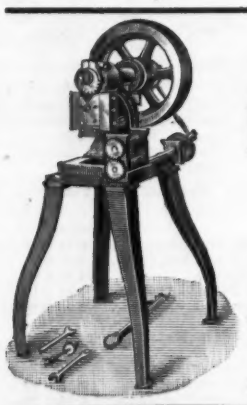

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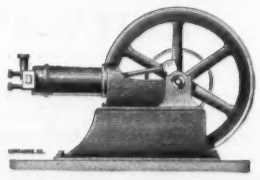

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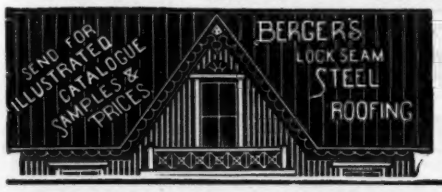

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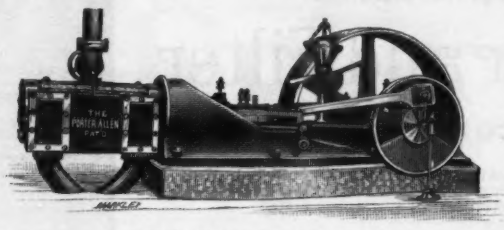

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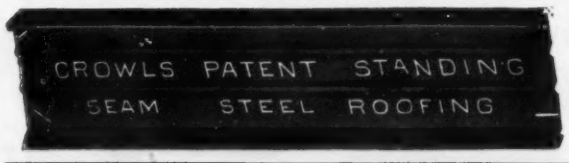

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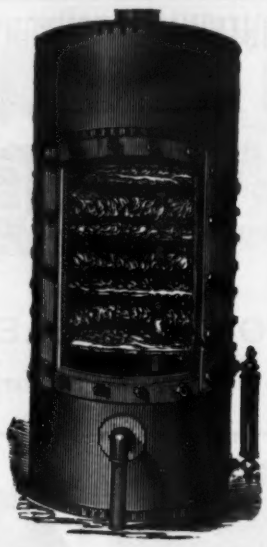

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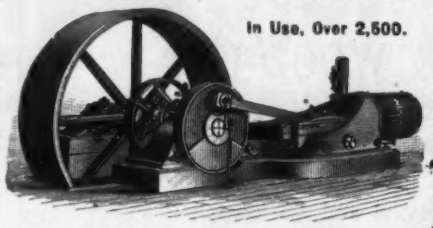

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